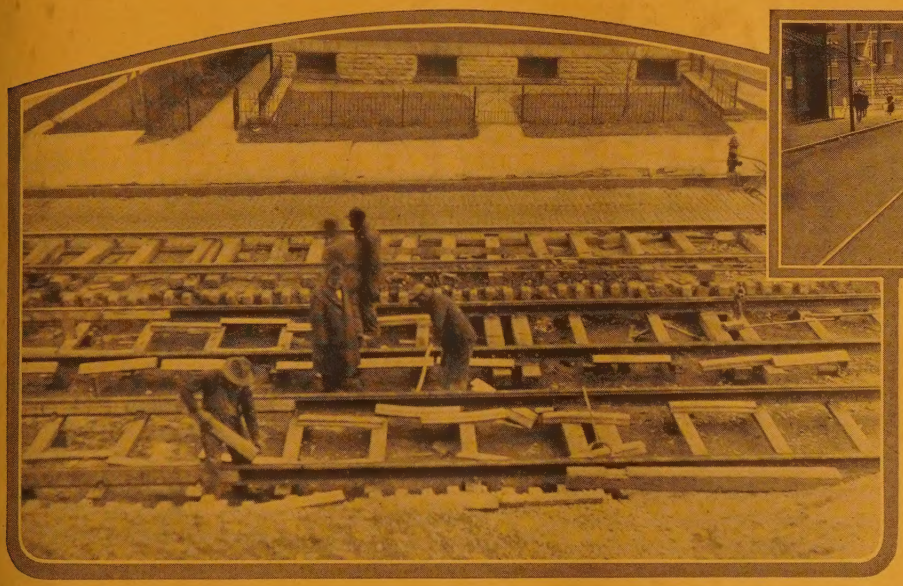
cGraw-Hill Company, Inc. June 13, 1925 Twenty Cents Per Copy

ELECTRIC RAILWAY JOURNAL



Above—Central Ave., Cincinnati, O. Built 1918. Carey Elastite Rail Filler used. In perfect condition. No repairs

At left — Installing Carey Elastite System of Track Insulation on Vine Street, Cincinnati, O.

Making Vine Street as Good as Central

Cincinnati was the proving-ground for the Carey Elastite System of Track Insulation. It was one of the very first cities to install Carey Elastite rail filler.

Years ago when Cincinnati relaid the wood block paving of Central Ave., Carey Elastite Rail Filler was used. Despite the heavy downtown traffic, not a block has been displaced by rail vibration, traffic-impact, or frost. The street is as smooth and watertight as the day it was laid.

The Carey Elastite System of Track Insulation—greatly improved since Central Avenue was built—was used in the reconstructing of other Cincinnati streets. Vine Street was made as good as Central Avenue. The street railway company will save money thru decreased maintenance costs and prolonged life of pavement.

THE PHILIP CAREY COMPANY
53 Wayne Avenue, Lockland, Cincinnati, O.

Send for complete data and typical construction plans.

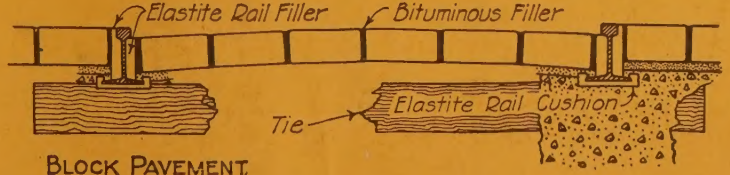
Carey Elastite

Elastite Rail Filler is Easy to Install

a tap of a mallet holds it in the web of the rail.

Carey Elastite Rail Filler is a composition of specially-tempered asphalt and fibre which is used as a resilient cushion between the rail and the pavement, absorbing traffic-impact, rail vibration and traffic-noise. It is preformed to fit any rail-section and is readily shaped on the job to fit any track-curve. It is unaffected by moisture or temperature changes and is enduring under all service conditions.

SYSTEM OF TRACK INSULATION



BLOCK PAVEMENT

U. OF ILL. FEB 25 1941 PER. DUP

Another Good Reason

WHEN the Norfolk & Western, the Virginian, and other heavy-grade, large capacity roads electrified, their one thought was to accomplish more work with a greater efficiency.

In addition to hauling heavy loads up grade, useful work is accomplished on down grades by the locomotive holding heavy trains without the use of brakes, at a saving in fuel consumption and a reduction in air brake and mechanical parts maintenance.

This feature—Regeneration—goes hand-in-hand with Electrification and is Another Good Reason why the best, cleanest and most efficient servant—Electricity—should be working for you on your road, just where the work is hardest.

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of
the United States and Foreign Countries

W WESTINGHOUSE ELECTRIC

Westinghouse

X 81735

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

MORRIS BUCK, *Managing Editor*

Volume 65 New York, Saturday, June 13, 1925 *Number* 24

Detroit Municipal System the Prey of Politicians?

POLITICS has laid its heavy hand on the Detroit Municipal Railway. Ross Schram, general manager, and I. N. Merritt, auditor, are out. Mr. Schram was dismissed by Mayor John H. Smith for "inexperience and inefficiency" and for "neglect to furnish me with reports which I have repeatedly requested." Mr. Schram charges that it was impossible to get the Mayor's attention. One charge or the other is false. It ought not to be difficult to determine which one. Apparently taking the cue from these cases, C. E. Wilcox, claims attorney, sent in his resignation the following day. He gave no reason for retiring from the public service. Two members of the Street Railway Commission voted with the Mayor for dismissal. The other member is in Europe. Following the announcement of the dismissal Commissioner Barlum ran to political cover by putting the incubus for the removal upon the Mayor. It is understood that during his campaign Mayor Smith openly stated that if elected he would remove Mr. Schram.

The Detroit *Free Press* almost cites in justification of Mr. Schram's removal the political doctrine that to the victor belongs the spoils. It charges that in the first place Mr. Schram "was given a place under the Street Railway Commission purely as a reward for political services." It attributes Mr. Schram's present discomfiture to the "natural fortune of a war in which he engaged of his own accord." Apparently it never thought much of Mr. Schram. The comment of that paper begs the whole question. Undoubtedly had there been no politics in the matter there would be no municipal ownership in Detroit today. If politics may be said to account for Mr. Schram, does it also apply to Mr. Merritt and Mr. Wilcox? On the other hand, the Detroit *News* says that the reason for Mr. Schram's dismissal is not inexperience or inefficiency. That paper says it is politics and that Mayor Smith would have been honest if he had said so.

While fair treatment of the individual is a matter of concern to ELECTRIC RAILWAY JOURNAL, the principle underlying the action is of far greater moment. If Mayor Smith is right about Mr. Schram's inexperience and inefficiency, then W. B. Mayo, chief engineer of the Ford Company and former general manager of the railway, a man of great talent and wide experience, is wrong. It was he who recommended Mr. Schram for the job. Perhaps Mr. Schram's attitude toward the Mayor was not as conciliatory as the relative positions of the two men appeared to demand, but as between the judgment of Mr. Smith and Mr. Mayo, the weight of evidence seems to be with Mr. Mayo. As for the charge of inexperience, ELECTRIC RAILWAY JOURNAL, if it so desired, could publish a long list of men with no previous electric railway experience who have made conspicuous successes in electric railway work. Previous experience is undoubtedly an aid to success, but it is by no means an assurance of success.

Mr. Wallace, the new general manager, has wide experience. He is a capable operator. He had been assured that politics will not be allowed to interfere with his work. It is to be hoped that it will not, but in view of what has happened he does not enter upon his new duties under auspicious circumstances or prospects that are promising. If he doesn't play with politics, politics may play with him. The poison of politics is particularly penetrating. In this connection these words of the ELECTRIC RAILWAY JOURNAL, uttered only three weeks ago, were ominous: "When the bird of political patronage flies in at the window the competent ones will go out at the door. It is anybody's guess how long it will be before that event takes place." At this long distance the only conclusion that can be drawn is that the railway is apparently slated for political picking. If this be true, Detroit is face to face with calamity.

Realigning the Interurbans for More Effective Service

SIGNIFICANT action that may lead to a new set-up of the interurban lines was taken at the recent meeting of the Central Electric Railway Association. Following the lead of John A. Beeler, who outlines the situation in a paper abstracted elsewhere in this issue, the association passed a resolution to the effect that the lines in the central territory should be consolidated into one system. This is a radical move, but it is dictated by necessity, as Mr. Beeler pointed out.

The interurbans in the Middle West have been making a game fight during the past few years. It has, however, been a losing one. Passenger business has fallen off and little else has been developed to take its place. The result is that the revenues have been decreasing. As with properties all over the country, expenses have been increasing meanwhile, until the margin between income and outgo has been wiped out. Some of the properties have been forced into receivership, while others are barely able to meet their charges.

Consolidation of these properties would have many beneficial effects. Centralization of control in one aggressive management would do much to improve the situation. As it is, there are many small companies with interests more or less in common. Agreement on policies and practices that might have been beneficial to the participating companies often has not been reached. The reason for this lack of progressiveness has not always been well founded.

A new alignment of the properties would permit many economies, but better still it would make possible a new conception of service. Freight could be routed through without the difficulties that inhere in the present method. This would allow the system to obtain new sources of revenue. High-speed passenger service could be given in some places, with parlor car and sleeper service between principal cities. Local passengers, on the other hand, could be handled better on light-weight cars or on buses than in the 50-ton cars now used by most of the railways under consideration.

To make such a plan effective would require the addition of considerable new capital. The roads in this territory are now taking in some $48,000,000 annually, with operating deductions of about $39,000,000. Fixed charges amount to approximately $12,000,000. It is estimated that some $5,000,000 to $10,000,000 would be necessary for the purchase of equipment. But with this comparatively small capital outlay this annual loss of some $3,000,000 could be changed into an annual surplus of like amount. More money could be used with profit to provide additional trackage and to build belt lines around some of the larger cities. Surely here is something worth while. It requires only capitalists with sufficient vision to realize that here is an opportunity not only for profit but for real service to all who reside in this territory.

Telling the Public that the Railway Is Ready and Anxious to Serve

WHEN a traveler alights from a train in a strange town it is a rare occurrence for him to see any sign that will indicate whether the trolley lines in that city afford a direct route to the various hotels or even to the business district. Rather than use the time and take the trouble to inquire, the stranger usually hires a taxicab and spends from five to ten times as much as would be necessary to travel by electric car; sometimes for a ride of only a few blocks.

Electric railway officials perhaps assume that the public knows which local line is the principal link between the station and the center of the city, but they forget that strangers wish to know the particular car that will serve their needs, where it can be boarded and when it will leave. Some railways have taken steps to fill this need, but the majority have not.

Another phase of this service that should be given attention is the arrangement of schedules so that cars will be available when trains arrive. Even if the traveler knows that the trolley line reaches his destination, if a car is not at hand when he wants it, he will use some other conveyance which is ready to take him.

There are many ways to furnish the information and service desired. An employee stationed at such points to direct strangers would probably be the most effective method, but conspicuous signs near or in the station, located so that they will catch the eye of prospective passengers, would be of value. A stranger alighting from a train usually looks about for directions. A flashing electric sign would be sure to attract his attention. There is a need for this kind of advertising, and the traveling public should be advised at every possible opportunity that a wide-awake electric railway is ready and anxious to serve it in that particular city.

Use of Street Railway Tracks by Other Vehicles Causes Needless Delay

CASES where traffic regulating authorities show any interest in keeping street car tracks free of other vehicles are rare compared to the number of cases where they are entirely indifferent. Yet it is often the moving vehicle, so called, rather than the parked vehicle that is the cause of interference and delay to railway operation.

At street intersections where "stop" and "go" traffic regulation is enforced, all vehicles must stop while the cross movement occurs. Moving vehicles which have been following the railway tracks stop in the path of the cars. Two or three such vehicles may force the car to stop at a considerable distance from the intersection. When the street is open to traffic again, the other vehicles hurry across, but the car usually must make a second stop at the intersection to accommodate the passengers waiting there. During this second stop the direction of traffic movement is quite likely to be changed, necessitating a considerable additional wait on the part of the trolley.

Had the other vehicles been required to keep to the side of the street they would have been delayed at the intersection no longer than they were when standing on the tracks. The street car, however, carrying many more people than the automobiles, is subject to altogether unnecessary delay from their presence ahead of the car. No one denies that theoretically street cars should have right of way on their own rails. In practice, however, very little is done to see that they get it. If city officials are really desirous of doing something to promote the orderly and expeditious movement of traffic in the street, a great improvement can be made at small cost by keeping other vehicles out of the car tracks.

Public Utility Advertising Is a Real Benefit to the Consumer

SOME super-critical citizens are apt to take exception at times to the spending of money by an electric railway in publicity. Whether it is in the form of newspaper displays or other kinds of advertising, these critics contend that the money thus spent might better be devoted to reducing fares or extending the service. Especially is this the case when the publicity is of the nature known as good-will advertising.

In an address at the recent meeting of the Associated Advertising Clubs of the World, Martin J. Insull of Chicago points out that a utility, by advertising, can secure more business and a larger gross income. This means production on a larger scale and usually with greater economy. Necessarily, all of this gain goes to the user, as under commission rule the utility is not allowed to receive any larger net return per dollar invested after it is already earning a fair return on its capital.

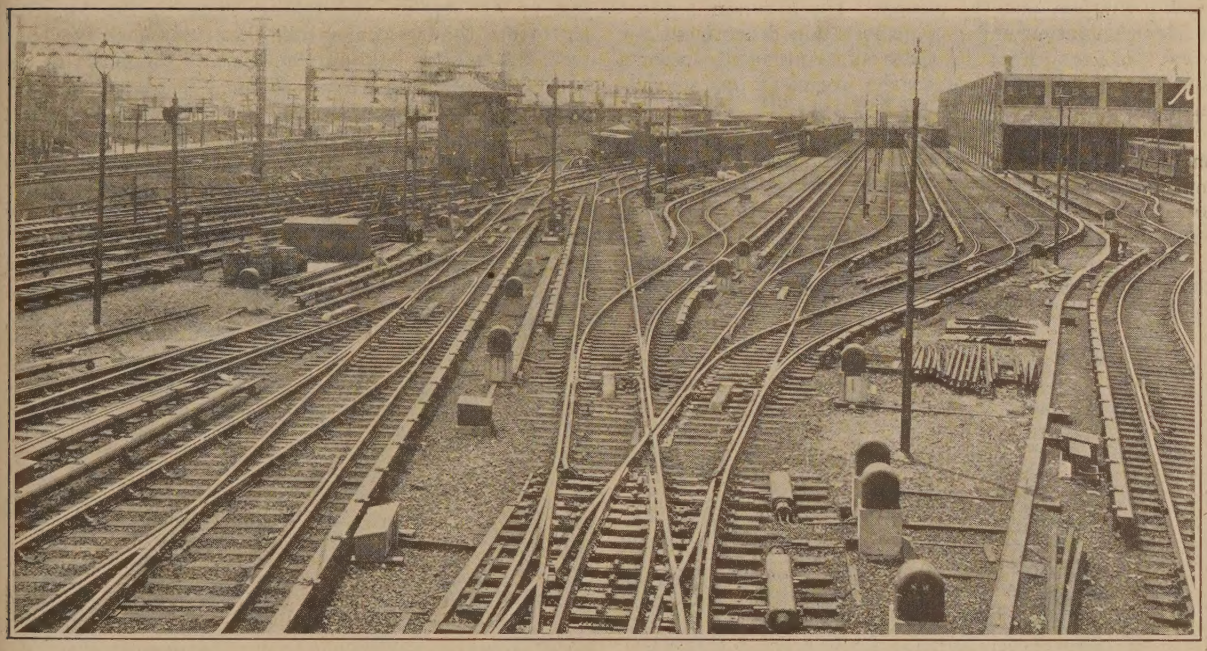
While the gain to the consumer from good will advertising is possibly less apparent than that from advertising an extension of the service, it is none the less real if it helps to bring about fairer treatment by the public. Moreover, this means that the business of the utility is less hazardous and consequently that the utility can borrow at lower interest rates.

Those who criticise utilities for incurring expenses for publicity explain their attitude on the ground that the utility is a monopoly. They freely admit that the business world as a whole accepts advertising as a necessity. Of course, any other position would not be tenable at the present day, but the argument is put forth that the same reasons for such advertising do not exist with a utility where there is no competition.

In a certain sense, however, no utility, even if it is protected by law from competition, is a monopoly. In the case of a railway there is always the competition of private means of transport—such as walking and the automobile or people can stay at home and not use any transportation. Advertising is needed to develop business even for a so-called monopoly. In fact, it would be rather difficult to prove that a utility really has much less any less need to advertise what it has to sell than a competitive business.

Train Operation by the Interborough

Functions of the Transportation Department of a Rapid Transit Railway Differ from Those of a Surface Line Because of the Arduous Operating Conditions—Organization of the Interborough Rapid Transit Company and Duties of Various Classes of Employees Are Described



Yard at East 180th Street, Borough of the Bronx, Where Trains Are Made Up. This Is One of a Number of Such Yards in Various Locations

CONDITIONS of operation on a rapid transit line differ materially from those on a surface line because of the clear right-of-way, the high speed which has to be maintained between stops, the greater traffic, operation under the restrictions as regards clearance usually inseparable with a subway and elevated railway as compared with surface operation, etc. In New York city these restrictive and arduous conditions are probably found at their maximum. For these reasons an account of the methods on the Interborough subway should prove of interest to other companies, especially those whose operation tends to become heavier in character.

Some striking examples of the volume of traffic on the Interborough Rapid Transit System in New York, the mileage made daily by its cars and the effect of the severe conditions of operation on the maintenance of its equipment were published in the first part of an article in the issue of this paper for March 19, describing the maintenance practice of the Interborough company. There are still other conditions which make its methods of dispatching and operating trains notable. Some of these will be briefly mentioned:

The Interborough Rapid Transit Railway is the only rapid transit railway operating ten-car trains in regular and continuous service.

It has the largest number of miles of rapid transit track and the largest number of miles of subway track in the world.

It is the only rapid transit railway employing in train service an average of materially less than one trainman per car.

Including the Manhattan division, it carries more than 1,000,000,000 revenue passengers per year, which is considerably in excess of any other rapid transit line.

New York City is the only city with any considerable amount of four-track rapid transit railway, two tracks being used for local service and two for express.

New York is the only city in which rapid transit trains are operated continually at maximum speeds of 45 m.p.h. on as close a headway as less than two minutes.

It is needless to say that very few of the passengers on the subway trains of the Interborough Rapid Transit Company realize the elaborate organization required to give this transportation service or the extensive precautions in use to insure the safety of the passengers. It is probable that even among railway men there is not a full conception of the methods used by the transportation and other departments to keep in operation the subway trains which most of these railway men use as passengers when they visit New York. It is the intention of this journal to publish several articles relating to a number of these different matters, notably the organization of the transportation department, the systems of lighting, ventilation, pumping, emergency block alarms, telephones for regular and emergency use in the subway and signaling, and the system of multiple-

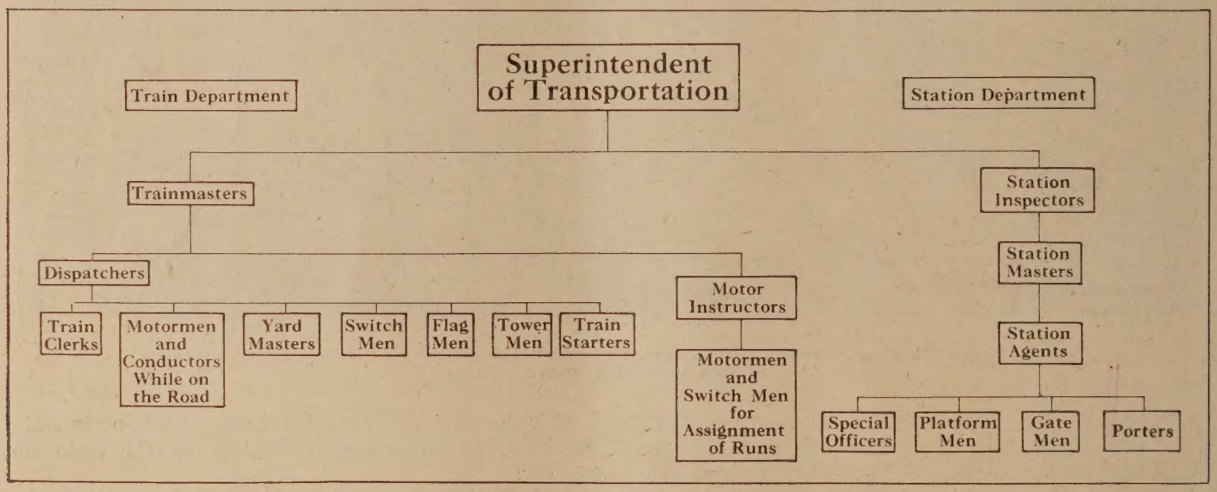
unit door control. Several articles on the inspection shops and maintenance practice have already appeared.*

The present article will describe the organization of the transportation department and the method of dispatching and checking train service.

DUTIES OF SUPERINTENDENTS AND TRAINMASTERS

For purposes of operation the transportation organization on the subway division of the Interborough Rapid Transit Company is kept entirely separate from the elevated division, and the company has a superintendent of transportation and a transportation department for each division. Each of these superintendents reports directly to the assistant to the president and general manager.

On the subway division, which is the division being considered in this article, the transportation department is divided into two sub-departments, namely, that for the operation of trains and that for the direction of passenger stations. Both of these departments are in charge of the superintendent of transportation. His immediate assistants in the operation of trains are the trainmasters and in the direction of passenger stations are the station inspectors, as shown in the organization chart. This article will first outline the department in charge of the operation of trains.



This Chart Shows the Organization of the Transportation Department of the Interborough Rapid Transit Company for Subway Service

There are two trainmasters, one for day service and the other for night service, each with an assistant known as the assistant trainmaster. They exercise a general supervision over and are directly responsible for all employees connected with the train service and see that the trains move regularly. In case of accident or serious detention to trains they are expected to go at once to the place of trouble and assist in removing the cause.

SWITCHMEN TAKE TRAINS FROM YARDS AND DELIVER THEM AT TERMINALS

In the operation of the trains on the subway, the cars are not taken from the carhouses in the way that is usually followed on surface lines. There the crew reports to the carhouse and takes the car out from that point as a terminal. In the subway operation the crews, instead, report at a terminal, such as 242d Street or Woodlawn (two northern terminals), or at some intermediate station which is the terminal of a run, like Dyckman Street. They report there to the starter and begin their runs there.

The work of taking the cars to these terminals and putting them into their berths preparatory to a run is conducted by a different class of men, called "switchmen." This is necessary because the trains are made up of cars which may be on one track and may be on another track of the yards or carhouse. Besides making up the trains and taking them to the terminal platforms, the switchmen take the trains back from the terminal or other station platforms to the yards at the end of a train run. While engaged in this work, they are under the supervision of a yardmaster, but they receive orders as to the cars which they are to include in each train from the dispatcher. The dispatcher also instructs them as to the time when each particular train is to be delivered to the terminal platform ready for operation.

The standard ten-car train of the company is made up of seven motor cars and three trailers. These cars are always arranged in the following order, beginning with the north end of a train:

Motor, trailer, motor, trailer, motor, motor, motor, motor, trailer, motor.

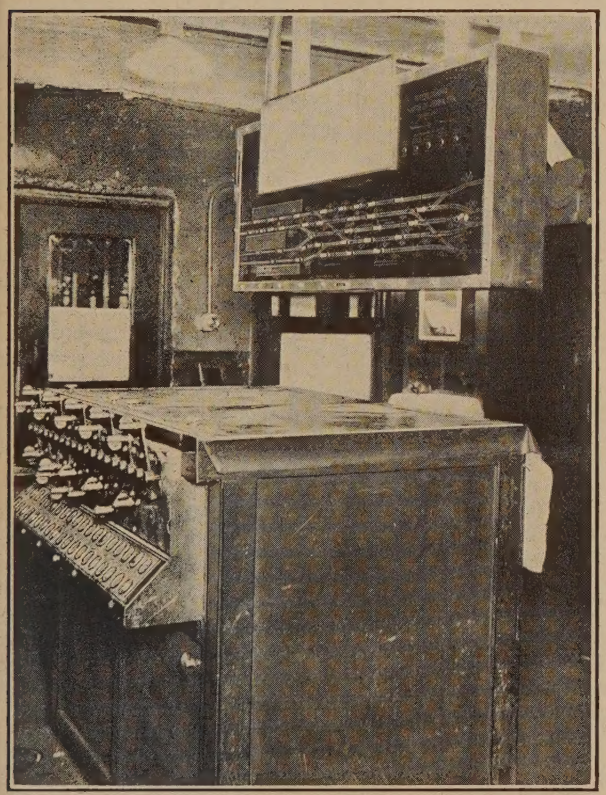
The switchmen are uniformed, and while in the subway and between sunset and sunrise in the open they carry lanterns, so their position may be known to other employees. The maximum speed at which they are allowed to operate trains at any time is 18 m.p.h., or the series position. On sharp curves and while crossing switches, the maximum speed permitted is only 9 m.p.h. Under no circumstances are they allowed to back trains at any point.

The switchmen are responsible not only for making up trains and operating them between yard and terminal platform but also for seeing that the train is in good condition before it is put in service by the car crew. This means that before the train is taken to the terminal platform the switchmen must see that the air brakes have been tested, that the safety gates have been properly locked, that the overhead door-control operating switches are in the proper position, that the train-line jumper is properly inserted between the cars and the cover down over the jumper plug, that the indi-

*See ELECTRIC RAILWAY JOURNAL for May 3, 1924; Aug. 16, 1924; Aug. 30, 1924; March 21, 1925.

cation jumper is properly inserted between all cars, that the indication short-circuiting plugs are inserted in the front and rear ends of the trains only, that all safety chains are connected properly between cars, that the bell cords are properly connected through the cars and in working order, that the motorman indication tests O.K. from the operating control on both ends of the train, that the battery switches are cut in, and that all other apparatus is in good condition.

Switchmen are also particularly enjoined to watch for defects in switches, signals and car equipment, especially during cold and stormy weather. They are in a good position to do this because they operate their trains slowly, and as they bring their trains into a station they can report promptly any defect noticed before their train receives passengers. The switchmen report to the dispatcher before going to work as well as when leaving work.



At Left—Illuminated Chart, Showing Position of Trains, in Switch Tower at 33d Street Station, West Side Lines. At Right—Dispatcher's Office at the North End of the 96th Street Station, West Side Lines. One of the Automatic Trips Is Shown Just Outside the Rail Near the Bottom of the Picture

As the switchmen are held responsible for the good condition of the trains as they are brought into the terminals and turned over to the car crews, their names also appear on the train sheet.

Starters Regulate Train Movement

There is a starter at every terminal station where trains are crewed. They have charge of receiving the empty train from the switchmen and turning it over to the crew. They see that these men are in proper condition and at their posts on the train when the train is ready to start, and in the absence of a train clerk, they ring the terminal bell to start the train. In the case of absence of a conductor or guard, the starter assigns the position to an extra and submits a record of the absence to the train dispatcher each day.

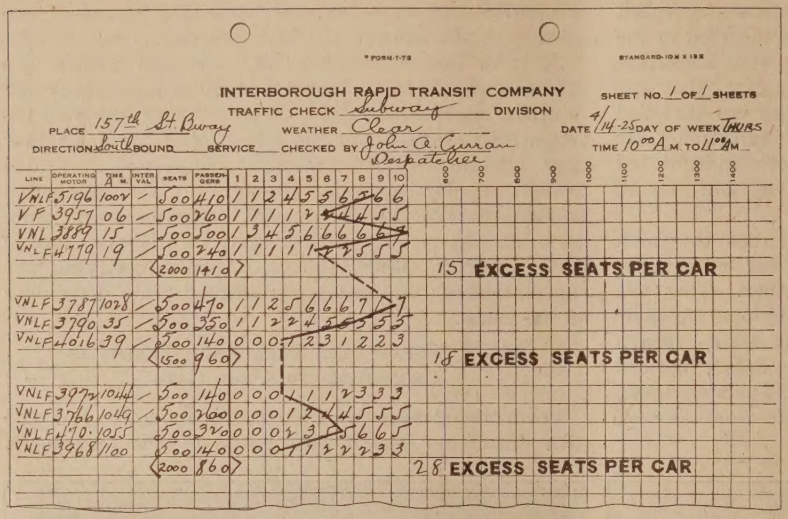
Starters at intermediate and terminal points also promptly report to the nearest terminal dispatcher and to other intermediate starters all unusual intervals between trains, and under the direction of the dispatcher they regulate the train movement and restore the trains to their regular intervals. Starters are also authorized to take charge at all unusual occurrences in train service in the vicinity of their stations in the absence of their superior officer, though at once notifying the superintendent, trainmaster or nearest train dispatcher of the event.

Train Dispatchers Turn Back Trains at Crossovers to Avoid Gaps

Train dispatchers are distributed along the line and each dispatcher has direct charge of the movements of trains within his section and of all transportation employees while in that section. Thus, on the Broadway-Seventh Avenue line there are six locations where dispatchers are on duty at all hours of the day and night, one eighteen-hour dispatching point and one nine-hour location. The dispatchers report to the superintendent, trainmasters and assistant trainmasters.

The dispatchers watch the operation of trains, and if there is any gap or serious delays in the train service they report the fact by phone to the trainmaster, who has authority to order trains turned at crossovers to avoid blockades on the entire line.

Train dispatchers at terminals also have charge of the yards and sidings at those terminals. At such points,



INTERBOROUGH RAPID TRANSIT COMPANY

TRAFFIC CHECK Subway DIVISION

PLACE 157th St Bway WEATHER Clear DATE 4/14-25 DAY OF WEEK THURS

DIRECTION South BOUND SERVICE CHECKED BY John A Curran Despatcher TIME 10^00 A.M. TO 11^00 A.M.

LINE	OPERATING MOTOR	TIME A.M.	INTERVAL	SEATS	PASSENGERS	1	2	3	4	5	6	7	8	9	10
VNLF	5196	10 07	–	500	410	1	1	2	4	5	5	6	6	6	
VF	3957	06	–	500	760	1	1	1	1	2	4	4	5	5	
VNL	3889	15	–	500	500	1	3	4	5	6	6	6	6	6	
VNLF	4779	19	–	500	240	1	1	1	1	1	2	2	5	5	
				2000	1410										
VNLF	3787	1028	–	500	490	1	1	2	5	6	6	6	7	7	
VNLF	3790	35	–	500	350	1	1	2	2	4	5	5	5	5	
VNLF	4016	39	–	500	140	0	0	0	1	2	3	1	2	2	3
				1500	960										
VNLF	3971	1044	–	500	140	0	0	0	0	1	1	2	3	3	3
VNLF	3766	1049	–	500	760	0	0	0	1	2	4	5	5	5	
VNLF	4170	1055	–	500	320	0	0	0	1	3	5	6	6	5	
VNLF	3968	1100	–	500	140	0	0	0	0	1	1	2	2	3	3
				2000	860										

15 EXCESS SEATS PER CAR

18 EXCESS SEATS PER CAR

28 EXCESS SEATS PER CAR

Form Used by the Traffic Checkers in Counting Traffic. The Graph in the Form Is Plotted by the Staff in the Traffic Bureau After the Report Is Received

also, they have charge of the making up of trains in the sense that they instruct the yardmaster of what cars to use in train makeup and how they are to be placed. They also have supervision of the starters at these points and see that the motormen and trainmen are ready for duty at the prescribed time and have all the time-tables, signals, lamps and other fixtures required by the rules for the operation of their trains.

Train Clerks Check Headways

Each dispatcher has in his office a train clerk who keeps a record of the number of each car arriving and departing from his station, with the route, arriving time, leaving time, etc. The records of this kind made at a terminal station show also the names of the conductor and motorman of that train and also the names of the switchmen who deliver the train at the terminal. A typical record of this kind is reproduced below.

The train clerks at points other than at terminals keep a similar record except that they do not fill in the names of the car crews.

Copies of these train sheets, as prepared at a terminal station, showing the numbers of the cars making up each train, are sent to the mileage department at 147th Street and Lenox Avenue. At the mileage department records are kept of the mileage of each car, and as a car approaches the mileage at which it is due for inspection the number is sent to all dispatchers and trainmasters. Such a list is submitted to these officials each day, giving the exact number of miles of those cars approaching a high mileage. These cars are then marked on the train sheet by the dispatcher for removal the following day by the switchmen so that they may be sent to one of the inspection shops.

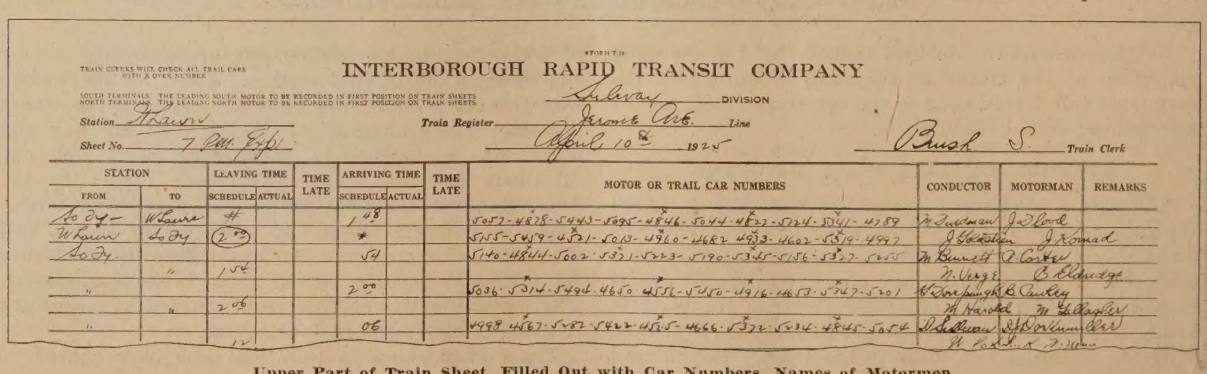
Towermen Control Switches

The towermen are responsible for the safe passage of trains over the switches in their charge. They are under the immediate supervision of the trainmasters of the division to which they are assigned and they obey all orders and signals in relation to the movement of switches and signals and the movement of trains given by the dispatcher on their section.

In the open portions of the subway they occupy towers commanding a good view of the track, as on steam railroads. These towers are not illuminated at night, as light would interfere with the vision of the signals and approaching trains by the towerman. In the subway the towerman often occupies a portion of the dispatcher's office.

In the most important signal towers there is an illuminated board, made of a frame of ground glass, on which the routes in the neighborhood of that station are painted. Along each route is a series of lights which show red or green on the board. The board is connected automatically to the various signal sections in the track, so that a clear section of track will show by green lights on the board and the presence of a train on a section will be shown by red lights. The normal indication of the interlocking home signals is "stop" and of distance signals is "caution." The signal levers are kept in the position giving these indications except when the signals are cleared for immediate train movement. Hence when a train enters its berth at a terminal station the signals are set against its leaving the station until its time of departure, as determined by the dispatcher. When the leaving time arrives, the dispatcher notifies the towerman to set the signals and switches for the departure of the train. This message is sent by an electric annunciator.

The track switches are operated by air, controlled by electric circuits and arranged by interlock so that a switch cannot be thrown unless the signal is correct and corresponds to the position of the switch. Compressed air for the switches is obtained from compressed air



TRAIN CLERKS WRIT. CHECK ALL TRAIL CARS WITH X OVER NUMBER

SOUTH TERMINALS THE LEADING SOUTH MOTOR TO BE RECORDED IN FIRST POSITION ON TRAIN SHEETS
NORTH TERMINALS THE LEADING NORTH MOTOR TO BE RECORDED IN FIRST POSITION ON TRAIN SHEETS

INTERBOROUGH RAPID TRANSIT COMPANY

Subway DIVISION

Station Bronx Train Register Jerome Ave. Line

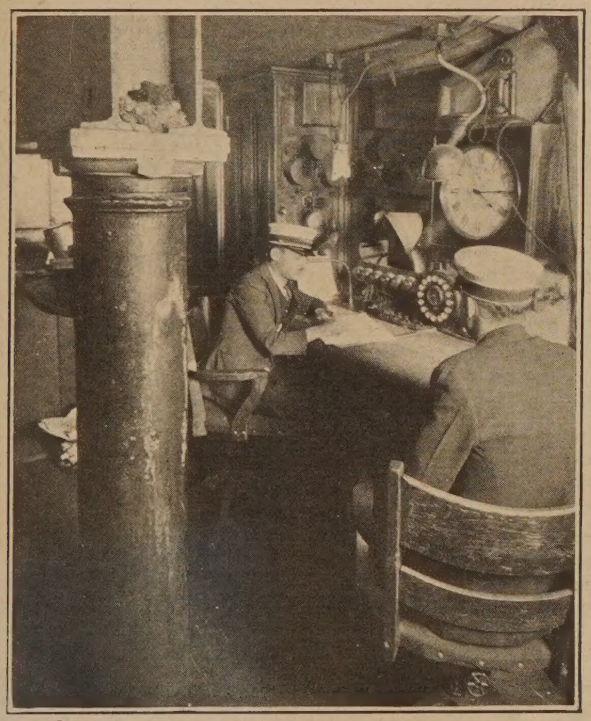
Sheet No. 7 PM Exp April 10th 1925 Bush S. Train Clerk

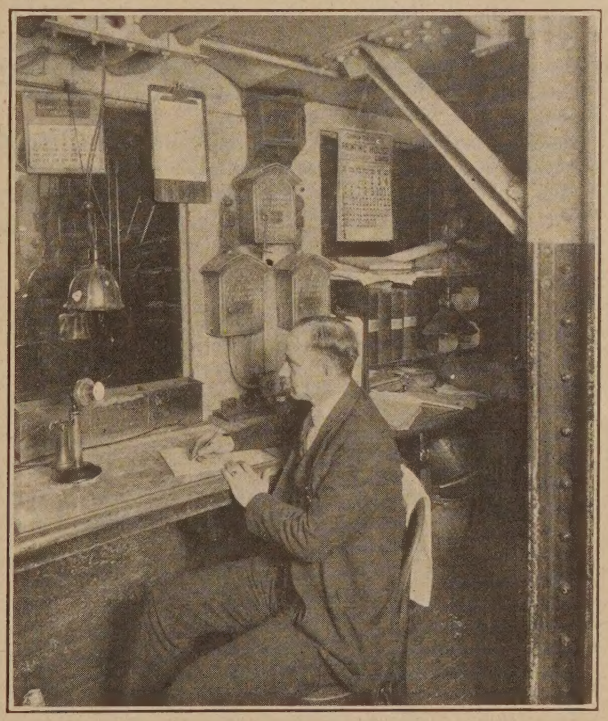
STATION FROM	STATION TO	LEAVING TIME SCHEDULE	LEAVING TIME ACTUAL	TIME LATE	ARRIVING TIME SCHEDULE	ARRIVING TIME ACTUAL	TIME LATE	MOTOR OR TRAIL CAR NUMBERS	CONDUCTOR	MOTORMAN	REMARKS
Lo Dy	W Farms	#			1 48			5057-4878-5443-5095-4846-5044-4827-5124-5041-4789	M Sullivan	J Lord	
W Farms	Lo Dy	2 28			*			5155-5479-4851-5013-4960-4682 4933-4602-5819-4942	J Hartigan	J Komad	
Lo Dy	"	1 54			54			5140-4844-5002-5021-5223-5190-5345-5156-5327-5055	M Burnett	A Carter	
									N Vargas	E Eldredge	
"					2 00			5036-5314-5494-4650-4556-5450-4916-4653-5347-5201	H Donoghue	B Conley	
		2 06							M Hanchet	M McCosker	
"	"				06			4998-4867-5182-5422-4555-4466-5372-5214-4845-5054	J Sullivan	J Donnelly	
		12							W Cox	E Nolan	

Upper Part of Train Sheet, Filled Out with Car Numbers, Names of Motormen, Etc., as Used on the Interborough Subway System

lines, supplied with air from compressing stations at different points and is carried in the subway at a pressure of from 65 to 70 lb. The electrical circuit to operate these compressed air valves is supplied through a storage battery at 20 volts. Edison alkaline storage batteries are used. There are two sets of batteries in each dispatcher's office, with fourteen cells in each set, each cell supplying about 1½ volts. One of these sets is charging while the other is discharging, and they are alternated each day.

Each towerman's office is equipped also with a stockroom of signal supplies. These include a supply of all kinds of wire suitable for signals and tagged with tags of different colors and numbers to indicate exactly where they go. There is also a variety of lamps, kerosene, electric, etc. A feature of the practice of the company is





At Left—The Interior of the Dispatcher's Office, 96th Street Station, West Side Lines. At Right—The Train Clerk's Office at the Same Station. The Position of the Train Clerk Is Such that He Can Observe and Make a Record of the Numbers of All Cars as They Pass on the Tracks in Front of Him

that lamps carried by the signal men are fitted with a green roundel, while all others carry a red or white roundel. This is to indicate the men who have authority in regard to the signals.

TRAINMEN

The trainmen report fully equipped to the starter at least ten minutes before the scheduled time for starting, or as much earlier as may be required. The rules also require them, if obliged to be absent on account of sickness or other unavoidable cause, to notify the motor instructor by telephone or letter at least two hours before reporting time.

Before leaving the terminal station, the motorman must test the air brake by placing the brake valve in service position to make certain that both the pneumatic brake and the electro-pneumatic brake are in good condition. He then observes the fall of the black hand on the air gage to determine the length of the brake pipe. Next he places the brake valve in full electric release position and observes the rise of the black hand and the fall of the red hand on the air gage to determine the number of cars in the train or the length of brake pipe and main line pipe. He then moves the electric brake switch to the "on" position and immediately back to the "off" position, listening for the exhaust of the air from the emergency magnet valve in the cab. He then closes the switch, but runs with caution until a running test of the electro-pneumatic brakes is made.

Motormen are also responsible for seeing that their front and rear markers are properly set and lighted. They hand in at the terminals at the ends of their runs time cards showing the amount of time made, actual reporting time and leaving time. These times are capable of being checked and are checked against the coasting clock record, as each trail car is equipped with a coasting clock.

The general responsibility for the train is on the conductor and orders in regard to the general operation of the train are sent to him. He is responsible, for instance, for seeing that hand brakes are let off before the train starts from the yard or siding, that the tail lights are properly set and lighted, that the safety gates between the cars and at the end of the train are kept properly locked, that the bell and bell cord are in proper working order throughout the train before it starts, that the trainmaster or dispatcher is notified promptly of any defects which interfere with the proper and safe working of trains, etc. He is also directly in charge of the passengers and is responsible for seeing that they are discharged at the nearest station in case a train is disabled, that unruly passengers keep order or are ejected, and similar duties. In cases of emergency the conductor has authority to give the motorman orders to

skip stations, but he must make a written report to the dispatcher of all stations skipped.

The guards are under the direction orders of the conductor. It is their duty to operate the door switches, announce stations and assist the conductor in his general duties in caring for the safe operation of the train. The rear guard also has the duty of protecting the rear of his train by going back with flag and lantern when his train comes to a stop at an unusual point where it is not protected by signal.

Maximum Speed of Trains Is 45 M.P.H.

The maximum speed permitted to trains in the subway is 45 m.p.h., but this is not allowed when the cars are descending heavy grades or while passing any switch or frog or while rounding any curves. The speed is reduced to from 9 to 20 m.p.h. over switches, to 20 m.p.h. while passing the shafts of the river tubes, and to 35 m.p.h. at all other points in the tubes under the river. The reduction in speed while the train is passing tube shafts is due to the fact that employees may be engaged at work at those points.

Another precaution used while the trains are making the passage under the river is to have at least 60 lb. to the square inch of brake pipe pressure. Motormen and switchmen are required to see that the gage is at this point before they enter an under-river tube.

Station Employees Collect All Fares

Another division of the transportation department also under the direction of the superintendent of transportation, as shown on the chart, is the station department. The chief officers in this department are the station inspectors, who report to the superintendent of transportation. There are four station inspectors, two for day duty and two for night. They have charge of all station masters, station agents, platform men and porters, and also of the gatemen at the few stations at which turnstiles are not used but tickets are sold.

The system is divided into zones, each directly in charge of a station master, who is responsible for seeing that the stations within that zone are kept clean and in order and that all station men on their stations perform their duties, though these station men report to and receive instructions from the station inspector rather than from the station master. The station agents are the fiscal officers of the stations. While under the immediate direction of the station master, they report to the treasurer of the company in regard to the cash received and to the comptroller of the company as to their tickets and turnstile accounts. They are also responsible, in the absence of a station master, for seeing that the ticket offices, station room, platform, stairways, etc., are kept clean. The station agents are provided with safes to accommodate the funds received by them. These funds are collected each day by representatives from the treasurer's department who give receipts to the agents for the amounts of money collected.

A great deal of this money, of course, is in small denominations, and agents are instructed to give this out in change, as far as they can, without giving offense, to the company's patrons. They are also authorized to supply banks, trust companies, business houses and local tradesmen of established reputation with coin in exchange for currency, but they are not allowed to deliver such coin themselves or to send it by any employee of the company or to allow it to leave the booth until the currency has been delivered.

The primary duty of the platform men is to serve passengers and speed their movements onto and off trains during train stops. When a train arrives at a station these men stand at the car doors and see that no passengers enter until those desiring to disembark have done so. After the passengers have boarded the trains, they assist in closing the doors and see that all doors are properly closed before the train leaves the station. If the train should be delayed, they find out the cause and immediately notify the station master or station agent.

Traffic Department Checks Loading

As on all large properties, there is a traffic department in charge of schedules and traffic check. The traffic checkers and the schedule makers are under the general direction of the superintendent of transportation, though all schedules have to receive the approval of the general manager of the company before they can go into effect. They also have to receive the approval of the New York Transit Commission.

INTERBOROUGH RAPID TRANSIT CO.

CY JFS SUBWAY DIVISION
TELEGRAPH SERVICE

FROM SUPT.
TO MR.GEO.KEEGAN April 3, 1925. 19
ASST.TO PRES.& GEN.MGR. TIME 9:25 A. M.

DATE: Friday, April 3, 1925 TIME: 8:21 AM express
FROM: 180th Street East TO: Atlantic Avenue

Detention: 7 mins.at Mott Avenue at 8:41 A.M.
Conductor Benedetto, Motorman Van Erde

DETAILS:

As train was pulling out of Mott Avenue station Train Clerk Finlay noticed a very bad flat wheel on 4517 (6th car). He immediately instructed Motorman Van Orden on duty to trip train and Van Orden did so, tripping operating motor 4615 on signal 2-L, stopping train at crossover. On investigating found a 3" flat on 4517. Trip was reset and train proceeded but ordered to discharge passengers. On arrival at 125th Street all passengers were discharged and train was laid up in spur at that point.

Block on Mott Avenue 8:45 AM
Cleared 8:48 AM

AJM

Form Used for Reporting Delays to Trains

The traffic checkers move constantly about the system under instructions from the trainmaster and count the loading of cars and headway of trains on both local and express tracks. When counting traffic, they are stationed at the departing end of a station, so as to count the passengers on the cars as they pass the traffic point while the train is under acceleration. The form used by them for recording these observations is illustrated on page 920.

The first vertical column in this form calls for the line or route. The next column calls for the number of the first car in the trains passing the observation point and the next column the intervals between trains. The next two columns call for the total number of seats in the train and the total number of passengers. The figures of these two columns are calculated from the figures in the following ten columns. These show the number of passengers (in tens) in each of the cars of the train. The maximum length of train in the subway is ten

cars, so there are ten columns. Each car has 50 seats, so that a car with all seats occupied and no standing passengers would be marked a 5 in this column; a car with twenty passengers, a 2; a car with ten standing passengers, a 6; a car with twenty standing passengers, a 7, etc. The traffic checkers have become very expert and can readily tell within ten passengers the load on each car and record these numbers as the cars pass their station. From these figures, the figures in the column headed "Seats" and "Passengers" can easily be calculated.

The practice in checking traffic is to divide each period into periods of twenty minutes. Thus, in the example shown, there are three periods of twenty minutes each, from 10 p.m. to 11 p.m. The number of seats and the number of passengers in each twenty-minute period are tabulated on the blank line at the end of that period. In the first twenty-minute interval shown, there are 2,000 seats and 1,410 passengers.

In this form, the report is returned by the traffic checker to the office of the traffic department, when each period is marked with the words "Excess passengers per car" or "Excess seats per car," as shown.

The cross-sectioning at the right-hand side of the sheet enables the traffic department to chart the load per train. These charted lines and all of the lettering at the right-hand side of the chart are put on in the traffic department, while the figures at the left side of the report are put in by traffic checker.

The traffic checker enters these figures in pencil with his sheet attached to a board and a watch exposed so that he can easily get the time.

Mr. Doherty Puts It Up to Toledo

In Correspondence with the City Council of Toledo, Henry L. Doherty Points Out Advantages of a Larger Proportion of Ownership of the Local Railway by Toledo Residents—He Also Suggests the Railway Might Be Willing to Shut Down Temporarily to Give Buses a Fair Trial, if the Council So Desires

RAILWAY affairs in Toledo have not run so smoothly as was hoped when the Milner service-at-cost ordinance was adopted there some four years ago. This franchise permits a fare to cover operating expenses and a return on the investment, but does not forbid competition. Since the first of the year there has been an even more general discussion on traction matters. There were complaints in the City Council that the service was not adequate, that the fare was too high and that the service could be given perhaps better by buses. In the meantime, a franchise for 25 years for the operation of buses in a city-wide system was requested by the City-Wide Motor Coach Company. The charge was to be 5 cents, with a 1-cent charge for transfer.

Henry L. Doherty, speaking for the Community Traction Company, has made several offers to the authorities to help solve the question of better transit for Toledo. One was that the city employ an outside expert to make a transit survey and study, and he offered personally to finance such a study up to $25,000. A second suggestion, made about a month ago, was that the company issue an 8 per cent preferred stock to raise $2,000,000 for needed improvements. He agreed to take $500,000 of this stock if the citizens of Toledo would subscribe for $1,500,000. His purpose, as expressed in his letter, was to enlist the active participation of the representative citizens of Toledo in a comprehensive transportation system. According to his proposition the control and management of the property would be transferred to this group of new stockholders. Neither the Board of Street Railway Control nor the City Council, however, was in favor of either of these plans.

Mr. Doherty Replies to the Council

Mr. Doherty's reply, which brings the situation up to date, was sent on May 29. After explaining that he would much prefer to make a personal presentation, but was not able because of his business affairs, he outlines his reasons for his suggestion that the control of the company be taken over by Toledo citizens and gives some of the reasons why better results had not been obtained from the service-at-cost franchise. In the first part of his letter he quotes from another letter, written by him recently to Mr. Goodwillie of the Board of Street Railway Control. This letter, slightly abstracted, follows:

Abstract of Letter from Mr. Doherty to Mr. Goodwillie

I read in the Toledo papers the report of the Board of Street Railway Control. I cannot concur in many of the statements made in that report, but I am not writing you this letter in your official capacity but merely as a brother engineer.

It has always been my contention that there is no excuse for engineers to disagree on any of the matters they are expected to know about, and also that engineers should be able to disagree with each other without giving offense and be able to sit down and talk things over until an agreement is reached.

I think practically everybody in Toledo is inclined to deal with this street railway matter as opportunists, and many of the things proposed would make it impossible ever to have a proper transportation system for the city of Toledo.

I hold:

1. That Toledo must have a comprehensive transportation system.
2. That this system must have a credit that will permit it to secure capital to enable it to keep pace or even anticipate the growth of the city.
3. To command capital it must operate at a profit and be reasonably free from jeopardy.

Therefore if Toledo must have a transportation system, and this system must have credit, then the citizens of Toledo should be willing to do whatever is necessary to create these conditions, and having done so there is no reason why the preferred stock of the company should not be both a sound and an attractive investment.

Let us assume for the moment that your water company was privately owned rather than municipally owned. What would the city gain or lose by compelling the company to work under conditions which made it impossible to earn a profit? The water company under this condition would be robbed of all credit and would be unable to raise the funds necessary to extend its mains or to enlarge its facilities from time to time as the city grew.

While we are operating a few one-man cars we are able to do this only by sufferance and the city has forbidden us

to use one-man cars, which is one of the most effective methods of reducing railway costs.

In my letter of the 5th to the Mayor I proposed turning over control to a group of Toledo citizens and wanted to make that group so representative that it would carry universal public confidence. If this group of men can get the co-operation of the City Council and the citizens, there can then be no question of the soundness of the investment.

Your suggestion that new capital should have priority over the present bonded indebtedness is, I think you will admit, under the plan I proposed, eminently unsound. I proposed to turn over the control and management of the street railway company to Toledo citizens on the theory that they would be owners of the equity. If they put their money into the company as a lien ahead of the present bonds they would merely become creditors—and certainly neither you nor any other sound business man would advocate the control and operation of a company by creditors, when their investment would not be jeopardized by bad management or anything else, until junior capital to the extent of four or five times their obligation had been wiped out. An equity holder must operate a property in the interest of all the security holders, and it is only the equity owners of a property who can be reasonably expected to have the interest necessary for the control and management of a property.

You say the service must be improved. This will require a rearrangement of the system and new capital. At the time when this should have been done the city refused to act, and some who opposed this action were prompted to do so because the owners of the road would receive an 8 per cent preferred stock for the capital they would advance. Now we are told that this same stock is not a sufficiently sound or attractive investment for the citizens of Toledo.

You speak of its being necessary to lower the fares. Except as this is done by increasing patronage and reducing operating expenses, a rearrangement and an extension of the system, requiring still more capital, it means wiping out all earnings in excess of operating expenses, and I am inclined to think that a rate of fare might be insisted upon that would even leave an operating deficit. If the fare was lowered to the point where there were no earnings left for either bond interest or dividends on stock it would not reduce the fare by even a single penny.

If the road can earn nothing for its owners, what incentive can there be for anybody to furnish new capital that you say should be provided for "adequately extending the service"?

If our operations have been faulty and the fare has reached the present point due in any way to us, then this is at least answered for the future when we offer to turn over the management of the road to a representative group of Toledo citizens if they will join us in providing the capital required to give a proper and adequate transportation system.

I think you will agree with me that Toledo could not possibly depend entirely upon buses for her transportation system and that Toledo must have a street railway system. It is true that the operating costs per mile for a bus is less than for a street railway, but it is also true that when traffic is heavy the cost of carrying the passenger is much greater with a bus than with a street railway system. It is also true that where the traffic is very light, and at the hours of the day when few people are riding, it costs more to drag around a big street car than it does a lighter bus. The best system available today is one in which the street cars are used as far as possible to handle the heavy and dense traffic and buses for other traffic. The buses should be entirely supplemental to the street railway system and not in competition therewith. What buses are operated should be operated by the Community Traction Company, and if the Community Traction Company is controlled by the representative citizens of Toledo, it seems to me that this should be the greatest insurance to the citizens of Toledo that they will receive a transportation service as good as it can be made and at the lowest possible cost.

If nothing is done at this time it simply means putting off the doing of something that must sooner or later be done. Toledo must have a transportation system and that system must have credit, and that means that it must operate at a profit. Anything less than this means the continuation of unsatisfactory conditions and higher expenses for transportation service rather than lower expenses. A system without credit cannot function and must periodically be resuscitated to save it from collapse.

Railway Willing to Permit Trial of Bus

After quoting from his letter to Mr. Goodwillie, Mr. Doherty continued in his letter to the City Council that both of the suggestions made by him—that of the study by an outside transportation expert, and a representative group of citizens take over the property—were prompted by a belief that possibly the gravity of the situation, from the standpoint of its bearing on the welfare of the city, was not entirely appreciated by the citizens. He said he was also convinced that whoever furnished the local service must, to do so satisfactorily, furnish the entire surface and be free from competition. Continuing, he said he noticed that two bus concerns claimed to be willing to furnish a complete city transportation bus service on a 5-cent fare, but if the Council believed this possible, or if any large element of the people of Toledo believed this possible, he feared it would be an effectual barrier to any arrangement the Community Traction Company might offer that would solve the problem. Before it can accomplish anything, therefore, these bus claims must be tested and disposed of in advance. Continuing, he said:

If you believe the city of Toledo can be served best and most economically exclusively with buses, we will agree that you should give a bus franchise to any concern you may select, and when it is ready to start operation we will suspend the operation of our cars, based upon an agreement that if the bus operations fail then they shall be ousted from the streets and we shall be given the right to resume the operation of our railway system with supplemental bus operations and without being subjected to competition, the decision as to whether the bus operations are more satisfactory and more economical than the system we propose to be determined by some tribunal mutually agreed upon. This is such a huge experiment and on such a gigantic scale that I hope it will not have to be resorted to, and I hope we can convince not only your honorable body but everybody in Toledo that the plan we recommend of a combination, co-ordinated, non-competitive transportation system made up of street railroad and bus is best for the city.

There is a vast difference between giving a transportation service and merely carrying passengers at such times and on such routes and hours when and where it can be profitably done. While most cities have recognized the folly of competitive transportation lines, nevertheless in many cities buses are allowed to operate in competition with the street railway company, yet they only operate when and where it is profitable to carry passengers and leave the street railway company to operate its cars throughout the balance of the city and the remaining hours of the day and night, even though for fifteen or sixteen hours of this period the cars are compelled to operate at a loss. We certainly intend to give this much-desired service for twenty-four hours a day just so long as it is possible, but our only recourse to protect ourselves from loss against bus competition will be to suspend operation of cars during the unprofitable hours.

After making this proposition, Mr. Doherty said that the position of the Board of Control and of the City Council seemed all in the direction of having the company bear the entire burden and make all of the sacrifices to enable these bodies to secure for the people of Toledo what they think the city should have. Nevertheless, the company is willing to make certain concessions. For instance, it would reduce the amount which the company was entitled to charge to its sinking fund to $100,000 per year, with the proviso that for every 1 mill reduction in fares, the sinking fund would be increased by, say, $10,000.

Essential Features of Modern Electric Car Truck Design*

A Discussion of the Functions of the Various Parts of the Modern Truck, Giving Reasons for the Present Typical Design — Development of the Car Truck from Early Types Up to the Present Single and Double Trucks in General Use

By Walter S. Adams
Designing Engineer the J. G. Brill Company, Philadelphia

DESIGN of electric railway car trucks naturally falls into a series of designs of the various constituent parts, with their correlation in such a manner that they function properly and efficiently. The major parts to be considered are the wheelbase, the frame, the bolster and transom, the spring system, the brake rigging and types of wheels and axles. These will be considered in turn.

The length of wheelbase is important. A long wheelbase contributes to the steady riding of a car. The length of wheelbase which can be used is entirely dependent upon the minimum curve over which the car must operate. When a long wheelbase truck operates around a short curve, the wheel flanges bind in the rail grooves and cause excessive flange and rail wear and ofttimes derailment. The diameter of the wheels is also a contributing factor to the length of the wheelbase. The smaller the diameter of the wheels the shorter are the binding points of the flanges in the rail grooves. In practice an 8-ft. wheelbase truck with 26-in. diameter wheels will negotiate a curve just about as freely as a 7-ft. 6-in. wheelbase truck with 33-in. wheels.

While the wheelbase is very important on four-wheel cars, it is not a problem when double trucks are considered unless the car body is narrow and would interfere with the proper radiation of the wheels on a curve. A good rule to follow is to make the length of the wheelbase on a pivotal truck at least equal to the gage of the track. Keeping the wheelbase on a pivotal truck within reasonable limits allows the truck centers under the car body to be increased, giving better support for the ends of the car. On high-speed cars, where step heights are not restricted, a liberal wheelbase should be provided as it contributes somewhat to better riding at high speeds.

Strong Side Frames Are Necessary

Truck frames are subject to great vertical stresses. They must support the car body and its load of passengers and transmit the starting torque of the motors and the braking stresses. Experience of the Brill company has shown that side frames of one-piece solid forgings without bolts or rivets to hold them together are the best type. They have outlasted other constructions such as cast steel, pressed steel, etc. A number of years ago pressed plate steel side frames were operated on electric and steam railways. Apparently they failed or the maintenance was too great, as there are comparatively few now in service.

The truck bolster supports the car body and partakes of the same vertical and transverse movement, but it is necessary for the bolster to turn with the truck when entering a curve. Center or pivot plates are used to allow the truck to turn in relation to the car body. These are usually made with a pocket for a lubricant and are arranged with renewable wear surfaces. Ball-bearing center plates have been used in some instances. They perform a very useful function in allowing easy turning of the truck on curves. On irregular straight track, however, where a certain amount of stability is desired to prevent the trucks from following the irregular line of the track, they have been found so sensitive as to be objectionable, allowing the car to nose from side to side. The truck bolster is confined between the truck transoms and it is desirable to restrict the movements to and from the transom to the smallest possible amount consistent with freedom for vertical and transverse movement. Wear plates have been used for many years for restricting the movement of the bolster in relation to the transom. The Brill company, however, uses what is termed a bolster guide in place of wear plates. This construction links the truck bolster to the transoms and allows a vertical and transverse movement but maintains a constant relation of the bolster away from the transoms. The pivot where these links are connected to the truck bolster is located above the bottom of the truck center plate. This prevents the bolster from tilting over when the brakes are applied or the motors accelerated. This tilting prevails quite frequently in constructions where wear plates are used. The bolster guide construction allows perfect vertical freedom for the springs to perform their function under all conditions of service. It provides what may be termed a floating bolster.

When the brakes are applied the trucks are pulled toward each other an amount equal to the extent of play between the truck bolster and the truck transom. The frictional contact between these parts prevents the bolster from having vertical freedom, without which there will be no spring action for absorbing the vibrations set up by metal wheels running on metal rails.

The object of the bolster guide construction is to avoid this condition and allow the springs to perform their proper function without frictional contact or interference between the truck bolster and the transoms of the truck frame. This device also reduces the amount of the air brake piston travel by eliminating the usual play between bolster and transoms.

Both Coil and Elliptic Springs Are Used

The usual spring system for city trucks includes coil springs over the journal boxes to cushion the truck frame and the suspended end of the motor. Their con-

*Based on a lecture before the educational conference of the Boston Elevated Railway.

tribution to good riding is almost negligible. The car body is supported on plate springs under the truck bolster which are usually of a full or a semi-elliptic type. These springs must be made of sufficient capacity to carry the maximum passenger load that can be crowded into a car and requires a very strong construction. Springs that are made for carrying heavy loads do not give the best results when a car is lightly loaded, and as light loads prevail the greater portion of the day, a system of springs is to be desired that will allow just as easy riding with a light load as with a heavy load. Such a system consists of a coil spring of limited capacity which is placed between the truck bolster and the plate spring referred to. Locating this coil spring between the plate spring and the car body allows it to absorb all the vibrations that pass through the heavy plate springs. This coil spring continues to act until the car has a seated load. Any additional load causes the bolster to rest on the coil spring seat, thereby putting this spring out of action. It remains out of action until the load is reduced, after which it again functions to give easy riding when the car is lightly loaded.

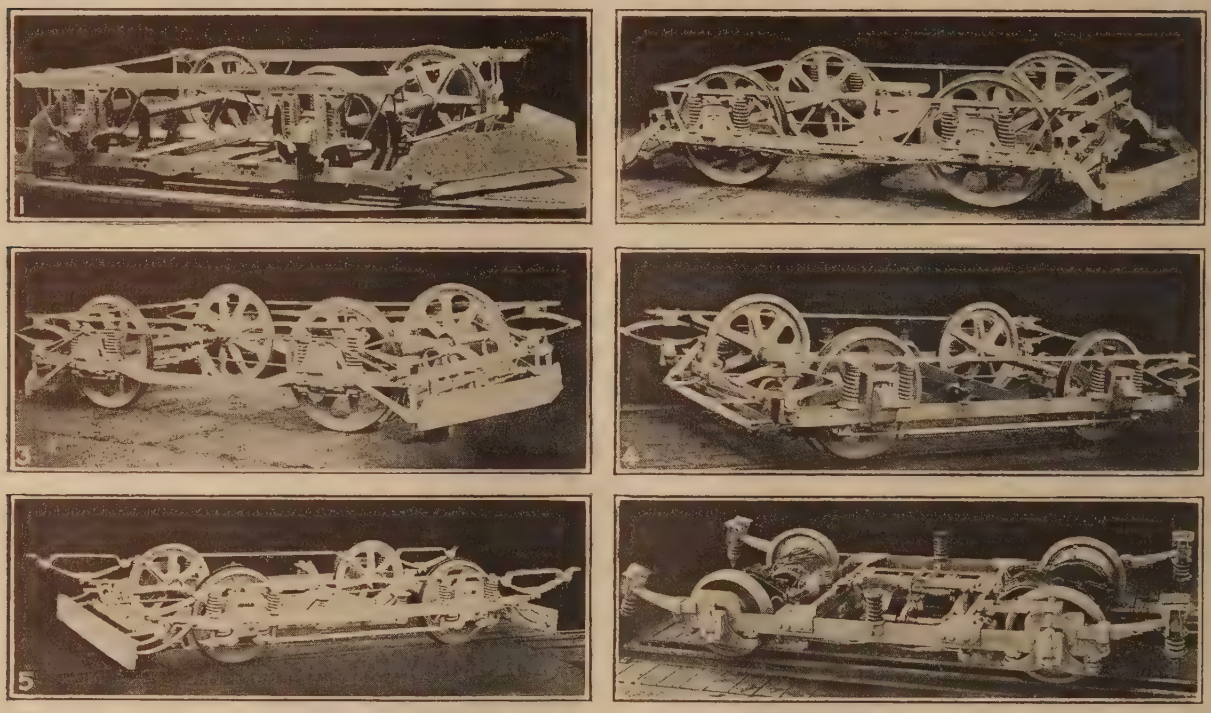
Somewhat associated with the spring system is the provision for allowing side easement of the car body when rounding curves or running on irregular track. This usually takes the form of links, one end supported on the truck frame, the other end indirectly connected to the truck bolster. These links cushion the side movement of the body. When a car enters a curve the trucks follow the rail, while the tendency of the car body is to continue on a straight line. The swing links allow the car body to be drawn back gradually to its normal relation to the truck. This is because as the links swing the car body is slightly raised. The weight of the car, therefore, acts in such a way as to restrict the swing of the links.

METHODS OF SUPPORTING BRAKE RIGGING

Brake design up to the present time provides for the use of metal brake shoes applied against the wheels. The combined pressure of all the shoes against the wheels approximates the weight of the complete car. To obtain this pressure a system of levers is used on the trucks in connection with levers on the car body. The pressure is approximately equal on all wheels except when maximum traction trucks are used, in which case the levers are arranged to give a pressure proportionate to the weight carried on the respective wheels. One of the problems in reference to brakes is to design a proper method of supporting the brake rigging from the truck frame. For many years a plain link and pin have been used for this purpose. However, as soon as a little wear occurs they become noisy and chatter. A number of different designs have been used to prevent noise and reduce maintenance.

The first design of axles for electric trucks had the check plate journal. This type of journal was used on practically all horse-car running gear. The check plate fitted into a groove in the journal and held the journal in close relation to the journal box. This was a desirable feature in view of the dust guard arrangement used in the journal boxes at that time.

As the speed and weight of cars increased, it was found necessary to use the same design of journal as on steam railroads. This has a button on the outside end of the journal and a shoulder on the inside end. Another type of journal that is used to a limited extent is a collarless journal. With this type the end of the



Representative Types of Electric Railway Trucks for Single-Truck Cars

No. 1. First electric truck, type No. 1, placed in service in 1888.
No. 2. Truck with axle box frames, type No. 7, for four-wheel cars, 1889.
No. 3. Elliptical springs used at extreme ends of frame, type No. 13, 1890.
No. 4. First solid-forged frame truck, type No. 21, 1892.
No. 5. Another solid-forged frame design, type No. 21-E, for four-wheel cars, 1896.
No. 6. Late design, with solid forged frame, for single-truck cars, type 79-E, 1924.

bearing or the journal wedge extends down over the end of the journal to restrict the end play.

The Master Car Builders' type of journal and journal box, which is now used almost exclusively, is one of the American Electric Railway Engineering Association standards. It allows considerable end play of the journal. This is not objectionable if the rails are in good alignment, but when rails are not in good condition this end play contributes to the side swaying of the car. The combined end play of the axle from one extreme to the other approximates ½ in. However, if thrust plates are used as provided for in the A.E.R.E.A. standards, this end play can be reduced.

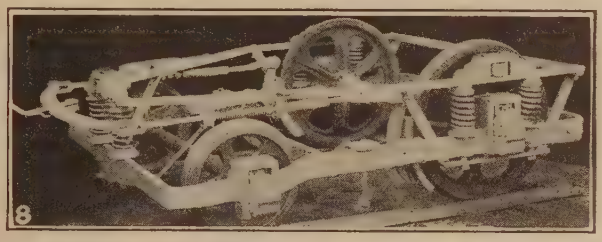
For electric railway service wheels are pressed on axles with a pressure which approximates 10 tons per inch of diameter of the bore. There is a tendency to reduce this amount of pressure as being unnecessary. Lower pressures have been found to hold the wheels tightly.

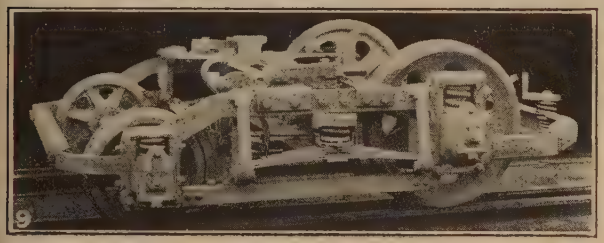
Ball and roller journal bearings have been so successful on gas motor trucks and pleasure cars that there have been repeated efforts to operate them successfully on electric cars. Automobiles have rubber cushion wheels which relieve the ball and roller bearings from road shocks and this, no doubt, contributes to their success in these vehicles. Where they have been installed on electric cars without any cushioning to relieve the metallic shocks between wheel and rail they have in large measure failed.

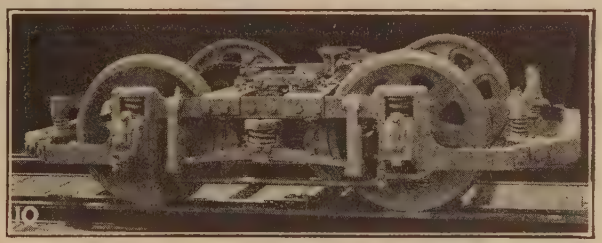
The Brill company has been using a rubber-cushioned steel-tired wheel on gasoline rail cars for nearly three years. These cars are equipped with roller bearing journals that have been very successful. This success can be attributed to the rubber cushion which insulates the wheel and rail contact from these bearings. Not only does this cushion wheel help the roller bearing but it also reduces the wear of the flange, as the rubber cushion is so installed that it allows horizontal as well as vertical cushioning. Many of these cushion wheels have a record of continuous service in excess of 110,000 miles.

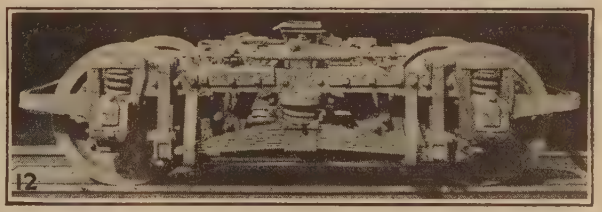
Development of the Single Truck

The first successful electric trucks for four-wheel cars were made more than 37 years ago. At first, with the use of electricity as motive power, they were simply modifications of horse car running gears with motor equipment hung upon the car body. In 1887 John A. Brill, the youngest son of the founder of the J. G. Brill Company, invented what is recognized as the first system of electric car trucks in which the truck frames supporting the motors, brakes, etc., were independent of the car body. This development permitted railways to keep their motor and truck equipment in service the year round, as trucks and motors could be removed from under closed cars and installed under open cars, and vice versa. These first trucks were of the cast pedestal type and had a unique system of springs. Instead of two or three pairs of springs, combining both coil and plate types as are used in most modern trucks, the entire spring action was provided by one set of coil springs arranged so that two coil springs were located at the sides of the journal box under the car body attachment frames. The entire brake rigging was supported on this set of springs. As the brake shoes were subject to the action of the springs it required considerable lever movement to bring the brake shoes against the wheels when the car body was loaded.





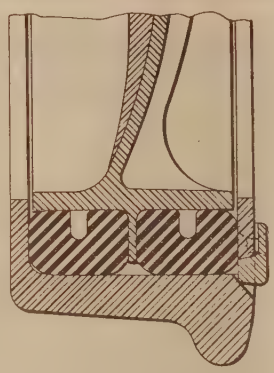




Types of Trucks Used for Double-Truck Cars

No. 7. First maximum traction truck, type No. 11, 1891.
No. 8. Maximum traction truck with solid-forged frame, type No. 11, 1892.
No. 9. Single motor pivotal truck, type No. 39-E, 1924.
No. 10. Bolster guide-spring system and solid-forged frame, type No. 76-E, 1924.
No. 11. Designed for high-speed service, type No. 27, MCB.
No. 12. Twin swing links, solid forged frame, type No. 77-E.

Subsequently, trucks were designed with axle box frames which rested on rubber cushions on the journal boxes. This practically rigid frame carried the brakes and free ends of the motors so that the coil spring system between the frame and the car body supported the latter only. This improved method not only eliminated the objectionable feature of excess slack in the brake rigging when the car body was loaded but also minimized the vibrations set up in the body by brake applications. In those days electric cars and trucks were short. As longer car bodies came into use there was more body overhang outside the wheels. This resulted in excessive end-to-end oscillation. To overcome this difficulty, truck frames were extended and elliptical springs were installed on the extreme ends of the frame to function in connection with the coil springs on both sides of the journal boxes. This combination of coil and plate springs, working together, increased the stability of the car body and resulted in improved riding action. Plate springs, of course, are retarded in their action by friction between the plates, whereas the coil spring is not restrained by any friction. Consequently it is quicker in its action.



Rubber-Cushioned Steel-Tired Wheel for Gasoline Rail Cars

The original axle box frames were formed of a number of parts bolted or riveted together. The severe condition of service to which these frames were subjected caused the bolts and rivets to work loose, requiring considerable attention to keep them in a serviceable condition. As early as 1892 the practice of making truck frames of solid forgings was introduced. This practice has been continued by the Brill company. With few exceptions this company uses forged truck frames exclusively. These were at first made under heavy steam hammers, but today they are produced on a set of specially installed hydraulic presses which range from 300 to 3,000 tons capacity.

Double Trucks Needed for Long, Heavy Cars

As car bodies were increased in length and weight they went beyond the limits of the ordinary four-wheel single truck, making it necessary to use double trucks, the first of which were the maximum traction type. At first this type of truck, with only one motor, was used in connection with large driver wheels and small pony or guiding wheels. The car body was supported at the side of the truck without the use of a bolster on the car body or on the truck.

One of the principal advantages of this type of truck was that it would curve between the long side steps on cross seat open cars, which were popular at that time. This was accomplished by locating the pivoting point on the truck close to the driving axle, reducing the radiation of the driving wheels so they would not interfere with the car sills or steps. On the trail end of the truck where radiation was increased small wheels were used so they could swing below the steps. This was the only type of truck that could be used interchangeably under long open cars and closed cars. This truck also permitted step heights to remain almost as low as on the smaller single-truck cars. The use of small pony wheels, as well as the single-motor feature, eliminated considerable weight. This type of truck did not have any mechanical center plate, but was guided in curving by angle plates bolted to the side sills of the car and a traveling kingbolt attached to a cross member of the car body. This type of truck, which was introduced as early as 1891, is still being produced.

The tendency toward heavy cars, particularly in cities with steep grades or hilly country outside of cities, made necessary the development of trucks having wheels of equal size and the use of quadruple-motor equipment. When the general reaction came toward smaller and lighter units of the Birney safety car type, the public, accustomed to the steadier riding double-truck cars, required a truck which would give the maximum amount of stability. This led to the development of a truck that carried practically all the weight on the extended spring base, still maintaining, however, the combination of plate and coil springs to obtain the most desirable riding qualities.

Accidents Decrease in St. Louis

DURING the twelve-month period ended March 31, 1925, the United Railways of St. Louis made a reduction of 5,642 accidents over the previous twelve months. The detailed figures follow:

ACCIDENTS FOR TWELVE MONTHS ENDED MARCH 31, 1925
UNITED RAILWAYS OF ST. LOUIS

	1925	1924	Per Cent Decrease
Collisions with vehicles	525	762	31.2
Collisions with persons	564	695	18.8
Collisions with animals	53	83	35.4
Collisions with motor vehicles	11,311	12,968	12.8
Car collisions	325	541	39.9
Car derailments	147	327	55.0
Boarding and alighting	2,140	2,541	15.8
Falls in car	885	880	.5*
Disturbances	609	936	45.6
Car equipment	45	190	76.3
Miscellaneous	2 041	3,877	47.3
Employees injured	130	210	38.1
Power plant	192	248	22.6
Maintenance of way	545	662	17.7
Shops and sheds	321	380	15.5
Electrolysis	38	41	7.3
Struck by doors	398	570	30.2

* Represents increase.

This is in spite of the fact that highway accidents of all kinds in St. Louis, as reported by the police department, increased 14.4 per cent and the automobile registration increased approximately 20 per cent.

These results, according to an article by E. J. Eastham, safety director United Railways of St. Louis, in the last issue of the *National Safety News*, may be attributed largely to a safety committee, representing all the departments of the company, appointed in February, 1924. A feature of the work carried on by this committee is the award of a prize each month to the carhouse having the best record as regards safety. To visualize the day by day accident records, a large wooden dial with two movable hands, one red and the other black, was installed in each carhouse. Each day the carhouse foreman sets these hands on the dial so that the red hand points to the total number of accidents for the cars from that carhouse up to that day of the month, while the black hand shows the corresponding total for the same month of the previous year. The slogan is, "Keep the red hand back."

The dials are so placed as to attract the attention of every employee coming into the carhouse before taking his car out, and to show him at a glance just how his division stands on accident reduction for the month to date.

Large Electrified Map Attracts Shippers

Through Routing in Central District Shown on Large Electrically Lighted Map Exhibited at Indiana Dealers' Convention of J. R. Watkins Company

BELIEVING that an ounce of exhibition is worth a pound of talk, the jointly maintained public relations department of the Indiana, Columbus & Eastern and the Columbus, Newark & Zanesville Railways has prepared a map 8 ft. square of the traction lines of

Map Used to Show Availability of Traction Lines

Ohio, Indiana and Michigan, and displayed it before the Indiana dealers' convention of the J. R. Watkins Company, large manufacturer and distributor of household commodities, held in Indianapolis on April 10. W. R. Huffer, general agent for the companies, who designed the map, was featured on the program under the heading of an address on "The Speed of Express at the Cost of Freight."

The map was constructed of beaverboard and mounted in a purple cloth-covered beveled frame with orange borders. It presents an attractive appearance. The various cities are indicated by small electric bulbs screwed into the face of the board with the wiring on the back, the traction routes being shown by broad red lines.

As the J. R. Watkins Company distributes direct from its nine branches through more than 5,500 sales people to consumers, any display of prompt and convenient methods of routing made to these men would be highly profitable. Moreover, since the branch that supplies the Indiana territory is located in Columbus, the I., C. & E. and the C., N. & Z are in a position to move much of this material.

Here the policy of selling electric transportation as a whole, instead of playing up a particular line exclusively, has proved its value. The shipper is not interested in any particular traction line. His interest is in reaching the points he desires.

Another interesting phase of the map's career was its display before classes in transportation and advertising at the Ohio State University. On this occasion Mr. Huffer made an address on traction transportation, in which he brought out the quality of initiative and spirit of service that distinguishes the industry. This display was made in connection with a project for advertising in the University Year Book by which the students in advertising classes entered a contest in writing the copy, a prize being awarded by the railway for the best advertising suggestion submitted.

Advertising Increased Service in Philadelphia

IN ITS recent publicity material, the Philadelphia Rapid Transit Company has been emphasizing its efforts to meet the demands of its patrons for more and better service. It feels that its patrons prefer this course to a possibly slightly lower fare with poor service.

During April and May, the company's car leaflet "Service Talks" contains the following statement in every issue: "P.R.T. is constantly striving by every means at its command to make its service more adequately meet your needs. When we fall short, we appreciate receiving from you information specific enough to enable us to correct the fault. Address your suggestions to: Service Talks, 1520 Spruce Street."

Company car cards emphasized that patrons were getting more service, as by reading "More Service on This Route," or "This New Car Which Helps Improve Your Service Is Possible Because of the Present Fare."

When the company bought 100 new cars recently from the J. G. Brill Company, each car carried a dash card,

Philadelphia Advertises Additional Service by Dash Signs

"One of a Hundred New Cars for Your Service." The accompanying illustration shows its appearance.

These new cars are the P.R.T. standard one-man two-man cars, with front entrance and center exit. They differ from the previous Philadelphia standard only in the fact that the width of the front door has been increased 3 in., making it 5 ft. 1 in. in the new cars.

Honeycomb Ventilators on Third Avenue Cars

In the article describing the new cars of the Third Avenue Railway, published in the June 6 issue of ELECTRIC RAILWAY JOURNAL, a misstatement was made as to the type of ventilators used. These are Railway Utility Company's "Honeycomb" type with lighting fixtures.

The Readers' Forum

Comments on Interurban Consolidation

AMERICAN ELECTRIC RAILWAY ASSOCIATION

NEW YORK, June 10, 1925.

To the Editor:

I have been much impressed with the receipt of the suggestion made at the Central Electric Railway Association meeting for consolidation of the facilities of the interurbans. Co-operative effort on the part of the carriers cannot help but be of great benefit in this respect, as in all other branches of the transportation utility service.

L. S. STORRS,
Managing Director American Electric Railway Association.

HENRY L. DOHERTY & COMPANY

NEW YORK, June 9, 1925.

To the Editor:

The suggestion made by John A. Beeler before the Central Electric Railway Association at French Lick that the interurbans in the central territory should be consolidated is certainly a good one. As a group of individual, comparatively small properties, their situation is difficult. The short-haul travel has in most cases nearly vanished. Long-haul business in which several properties participate has been developed only in small degree, largely because of the difficulties, as found in any line of business, of having so many parties to the agreements necessary with respect to service, operating practices, equipment and the apportionment of revenue and expense.

It really does seem as though a great step would be made toward establishment of these interconnecting interurbans on a profitable basis if they could all be brought together under some plan of consolidation or lease by a holding company and operated as a unit. Shippers would surely be attracted to do business with an electric railroad system of such extent, where it is hard to interest them with the present difficulties of such frequent interchange and the multi-division of responsibility among six or seven properties. I would like to see this consolidation made effective, as I believe it offers the most promising possibility of restoring the interurbans to a sound position.

While we are discussing this subject it might be in order to suggest a still broader unification and coordination of transportation facilities. Why not gather into one huge system all the bus and truck operations in Indiana and Ohio, together with the interurbans, utilizing each where it is most effective and in a way to contribute to the prosperity of the others? This is extending the principle that the city railway should provide all the public transportation in the city to apply to the state as well. The opportunity for doing so on such a large scale is more or less peculiar to these two states. But I believe it is worth thinking about here.

FRANK R. COATES,
President Central Electric Railway Association.

INDIANAPOLIS, IND., June 8, 1925.

To the Editor:

You ask my views concerning the consolidation of central interurban railways as suggested by Mr. Beeler at the Central Electric Railway Association meeting. I did not understand him to present a "plan," but only general suggestions as to advantages of such consolidation. Such consolidation would have to receive the approval of the public service commission of each state interested and also the approval of the interstate commerce commission. I consider any views I might give of no value, for they could be valuable only if based upon something that has been carefully considered and carefully worked out.

Many of the things mentioned by Mr. Beeler as desirable have already been accomplished and others are being accomplished by the association through its transportation and traffic departments. It may well be doubted whether a consolidation would be desirable if attained. Many may think more would be lost by disturbing the present friendly public relation than would be gained by a consolidation. Whatever might finally be the result of an effort for such consolidation, there certainly is nothing concrete before us now, and my judgment is that the present is not an opportune time for a discussion of the suggestion.

CHARLES L. HENRY,
President Indianapolis & Cincinnati Traction Company.

ANDERSON, IND., June 8, 1925.

To the Editor:

Answering your wire of the sixth, Mr. Beeler's paper is a valuable contribution to the discussion of the pressing problems which face the interurban industry. The suggestions are constructive, but require careful analysis and investigation and must assume a more concrete form before a correct opinion can be formed as to their practicability and the comparative advantages and disadvantages of the solution proposed.

ARTHUR W. BRADY,
President Indianapolis & Cincinnati Traction Company.

W., B. & A. Becomes "The Capital Line"

THINKING that it would have an advantageous advertising effect, the Washington, Baltimore & Annapolis Electric Railroad has decided to change the color of its cars from Pullman green to traction orange. At the same time a device representing the dome of

This Device Is Being Painted in Colors on the Sides of the Cars of the W., B. & A. Electric Railroad

the United States Capitol at Washington and carrying the words "The Capital Line" is being painted in the center of the side sheathing of the cars. The particular significance of this name lies in the fact that the railway connects Washington, the capital of the United States, with Annapolis, the capital of Maryland.

Association News & Discussions

Interurban Consolidation and Car Design Topics at C. E. R. A. Summer Meeting

Methods of Building Business and Development of Automatic Substations Also Considered at Three Well-Attended Sessions—Progress Made by Pittsburgh Railways Described—Lively Discussions Indicate Trend of Thought

MORE than 300 members and guests of the Central Electric Railway Association attended the summer meeting at French Lick Springs, Ind., on June 2-4. Despite two inviting golf courses and unusually warm weather, business meetings were characterized by fine attendance and carefully prepared papers and discussion of a wide range of subjects particularly important to the roads in the central territory at this time.

As expressed by President Frank R. Coates, the association was signally honored in having for its first speaker Lucius S. Storrs, managing director American Electric Railway Association. An abstract of Mr. Storrs' address appears on a following page of this issue.

Several other deeply significant papers followed. Under the title "A Major Operation on the Interurban," John A. Beeler, consulting engineer, New York City, advocated consolidation of the various connecting railways in the central territory for the purpose of effecting operating economies and building a more efficient electric transportation system to attract long-haul passenger and freight business. F. L. Blanchard, director of public relations Henry L. Doherty & Company, advocated a more general and more intensive use of advertising in all forms for building up a greater volume of electric railway business.

One entire session was devoted to the subject of power and its distribution. G. H. Kelsay, superintendent power and equipment, Cleveland Southwestern Railway & Light Company, outlined the trend of practice with reference to railway power systems. C. H. Jones, electrical engineer Chicago, North Shore & Milwaukee Railroad and Chicago Rapid Transit Company, spoke on automatic substation performance. L. D. Bale, superintendent of substations Cleveland Railway, described the results obtained from several years' experience with automatic stations on a strictly city distribution system. This power session was further enlivened by discussions from Allan J. Smith, superintendent of power Columbus Railway Power & Light Company, and C. C. Argabrite, electrical engineer Interstate Public Service Company.

Other papers included one on style in car design by Charles Gordon, Western editor ELECTRIC RAILWAY JOURNAL; a paper on car construction problems by J. A. Greig, editor *Electric Traction* and read by C. L. Van Auken, and a description of the steps taken by the Pittsburgh Railways for winning the confidence of the public, by Thomas Fitzgerald, vice-president of that property. The paper on style in car design, and a written discussion prepared by G. L. Kippenberger, assistant general manager St. Louis Car Company, are abstracted on another page. This general topic was also discussed by Thomas Elliot, vice-president Cincinnati Car Company.

On the subject of railway power systems, Mr. Kelsay compared conditions which are encountered in taking power supply from large interconnected systems with the former simple transmission line having comparatively small total connected power. He called attention to the reasons for the greater strain which is thrown on protective devices, and showed why it is necessary for modern circuit breakers to be scientifically selected and carefully adjusted to open in proper sequence under sudden overloads, so as to avoid disturbing the entire interconnected distribution system when this is supplied by several plants.

Line Losses Reduced by Closer Spacing of Substations

In his talk on automatic substation performance, Mr. Jones presented some interesting experience data accumulated by the North Shore Line over a period of years, and showing the degree of reliability which has been reached in automatic apparatus design. Of the seventeen substations in service on the North Shore property, ten are automatic and seven are manually operated. The total connected substation capacity is 19,000 kw. The largest single units in use are 1,500-kw. machines. An original substation spacing of 13 miles has been cut down to 6½ miles by installing intermediate automatic stations. This process of placing converting units at closer intervals along the line is again being repeated so that an ultimate spacing of 3¼ miles between conversion units will be obtained. Experience obtained over a number of years with automatic equipment has, according to Mr. Jones, demonstrated the advisability of reducing substation spacing to reduce line losses. With the longer spacing these were about 25 per cent, while with the 6½-mile spacing they were reduced to between 10 and 12 per cent.

During a period of eight years a careful record of performance has been maintained. Eight automatic stations have operated a total of 217,000 station-hours. The total d.c. output of these stations was 60,500,000 kw.-hr. and there were 305,000 complete starting and stopping cycles. One station installed in 1917 with a 500-kw. unit has made 77,000 complete operating cycles. These records, Mr. Jones pointed out, indicate the reliability of the apparatus used in even the early stations. He said that later stations have been improved, however, and cited the experience with a recently installed station of 2,000-kw. units, where the output during a year had been 7,000,000 kw.-hr. with practically no failures.

Experience on the North Shore Line includes both 25 and 60-cycle apparatus. There was consequently a period of change-over, which increased the likelihood of failures, but despite this condition, the average failures were one per 1,000 operations during the period of change and development. At present failures are extremely rare after the stations are once properly installed and adjusted. Careful records of repairs and maintenance show this item to be very small.

Buildings originally installed for automatic stations were very simple and small in size. There has been some development in practice as experience has been gained. When high-tension apparatus was first installed outside, the buildings were in some cases made extremely small. The savings in construction cost did not warrant this practice, and larger buildings are now being used. Recent substation buildings have inside floor dimensions of 35 x 26 ft., with an inside ceiling height of 15 ft. This size building is now considered sufficient for units up to 2,000 kw. Mr. Jones said that dissipation of heat from the machinery is a real problem, so that building ventilation was of extreme importance. He called attention to the reports of the power generation and conversion committee of the American Electric Railway Engineering Association and pointed out that they give much valuable information on this subject, which may well be studied by any property contemplating the installation of automatic substations.

Automatic Substations for City Service

Mr. Bale told of experience with automatic stations on a city system. He said that the Cleveland Railway went to automatic stations about five years ago and is using them both for supplying extensions of lines to outlying territory and for additional power requirements in congested sections of the business district.

Two 1,500-kw. units were used in the first station installed. There now are eight automatic stations in service, having a rated capacity of 18,000 kw., and two additional stations of 3,000-kw. capacity each are now under construction. Machines of 1,500-kw. rating are standard, for the purpose of reducing the number of repair parts required for maintenance.

Although considerable redevelopment was necessary in some of the first stations due to the use of makeshift apparatus, subsequent experience has been satisfactory, and has shown that automatic apparatus can be used profitably in congested downtown business areas.

Buildings for the first three stations erected in Cleveland provided 45 cu.ft. for each kilowatt of installed capacity. In later stations, this building size has been reduced to 15½ cu.ft. per kilowatt. Buildings on some of the more recent installations have outside dimensions of 41 x 41 ft. Considerably more apparatus is required in a city station than in one for interurban service, thus affecting the size of building required to house it properly.

Mr. Bale discussed the relative advantages of shunt and compound windings for converters in city stations. He said that the Cleveland property had decided to retain compound-wound machines after a careful study, in order to effect the power savings from properly maintained trolley voltage. He pointed to the effect of synchronized traffic control on power requirements, due to the starting of many cars simultaneously at various points in the business district. In Cleveland, he explained, the increased power requirement for this simultaneous starting has increased the energy cost from $20,000 to $30,000 per year. Shunt-wound converters used under these conditions would have resulted in reduced voltage and would have increased this energy cost materially. Beside the actual cost of energy involved, he said that the retention of compound-wound rotaries had been further dictated by the need for maintaining trolley voltage which would permit rapid get-away and acceleration of many cars simultaneously in congested traffic in the business area. The savings in time resulting, he held, are even more important than the actual energy costs involved.

Remote Control in Cleveland

Another characteristic of Cleveland conditions, described by Mr. Bale, is the large proportion of feeder sections that are connected to two stations. Of all trolley sections, 86 per cent are connected in this way. Consequently, supervisory control of stations was considered desirable, so that a central load dispatcher could reroute or transfer load in the event of a distribution system failure. Under the arrangement installed, the dispatcher can shut down or start any station at will. He has a graphic record of the load on all automatic stations before him, and also knows the voltage conditions existing at various locations at all times. With the equipment provided, he can correlate the operation of the eight automatic stations during normal times and can make any shifts of load required during an emergency. Previous to the installation of the remote control system, the automatic stations did not show a favorable 24-hour over-all efficiency, due to the converters running too long in some of the automatic stations. Since the installation of the remote control, the previous over-all efficiency of 85 per cent from bus to bus on the automatic stations has been improved to 95½ per cent. Results accomplished with automatic stations, Mr. Bale said, have been so highly satisfactory that the remote control board has been laid out for all automatic operation ultimately. This will require approximately 30 automatic stations.

In discussing the financial advantages of automatic substations for city service, he said that there are many benefits obtained from such control which cannot be definitely evaluated in dollars and cents, but which are nevertheless very important. Among these he listed increased efficiency, higher continuity insurance, due to the elimination of the personal element of the operator, and reduced electrolysis.

Comparative maintenance costs of automatic and manual stations were presented on the basis of total cost per converter unit. Mr. Bale pointed out that this method of comparison was not entirely fair to the automatic station due to the larger number of parts that are installed per converter as compared with a manual station. The figures, however, were as given below, averaged over a period of one year:

AVERAGE MONTHLY COST OF CLEVELAND SUBSTATIONS

	Manual	Automatic
Number of stations	5	8
Total rated capacity, kw.	33,000	18,000
Equipment maintenance, labor, material and superintendence	$146	$196
Buildings	219	270*
Operation, superintendence, inspection, etc.	362	184

*Includes maintenance of lawns, etc., used for decoration of automatic station grounds.

Of the eight automatic stations, five are almost new, which, he said, makes it likely that the maintenance account will be lower during the following year than during the period over which these figures were compiled. Mr. Bale added that one load dispatcher and helper are expected to be able to handle the entire remote control system when all stations have been changed over to automatic operation.

A. J. Smith agreed with the two previous speakers as to the reliability of automatic apparatus. He said that elimination of the personal element in switching was one of the most important advantages of automatic operation. In addition, he said that automatic switching apparatus handles emergencies faster and more reliably than can be expected from human operators. He maintained, however, that a higher grade of inspection personnel is required for automatic stations than usually is available for the maintenance of manual stations.

The relative energy economy of automatic and manual stations was compared by Mr. Argabrite, on the basis of a one-week test made on the lines of the Interstate Public Service Company. In this case, non-automatic operation of a station, running 24 hours per day, showed an energy consumption of 13,600 kw.-hr. at the a.c. side, while with full automatic operation of the same station, under traffic conditions that varied only by three cars for the week from the conditions under which the previous test had been run, the energy was reduced to only 11,050 kw.-hr. In a six months' test the efficiencies of his automatic substations from a.c. input to d.c. output ranged between 90.7 per cent and 92 per cent, while for corresponding manual stations the efficiencies were 81 to 84.8 per cent.

Combined Rail and Highway Car Proposed

During the meeting, W. J. Seitz of Detroit described briefly a patented system of combined rail and highway operation which contemplates the use of a light-weight trail car equipped with an eccentric axle which will enable it to be changed quickly from rail to highway, where the cars are to be pulled by light tractors, so as to permit plant delivery of products without rehandling.

President Coates read a copy of a letter written by Henry L. Doherty to the City Council of Toledo relative to the transportation situation in that city. In this letter Mr. Doherty sought to show some of the reasons for transportation difficulties in Toledo. This correspondence is published elsewhere in this paper.

Business Building Methods

The subject of building up through business was discussed by W. S. Rodger, general traffic manager Detroit United Lines. He held that the heavy diversion of both passengers and freight to automotive vehicles for hauls up to 50 or 60 miles calls for serious consideration by both electric and steam lines. He pointed to the increased operation of mixed freight and passenger trains by the latter as an evidence of the effort being made by the steam roads to give faster freight service and at the same time bolster up the earnings of some of their passenger trains. He also called attention to the increasing use of motor trucks by the steam roads for improving short haul service.

In spite of the diversion of traffic from rail lines, the speaker maintained that there is a constantly increasing demand for both passenger and freight transportation service. The agency which in the long run furnishes the best and most dependable service at comparable cost, he held, ultimately will get this business. Since the rail lines start with the cost factor in their favor, improved service is the key to getting the traffic. "Make the time faster than the other fellow and then tell the world about it" was his summary of the method required.

In the development of through traffic he explained the advantage obtained by the building of spur tracks into carload shipping industries, and advocated making every inducement to get track

into such plants. He also advocated close attention to getting industries located exclusively on electric railways, and suggested that electric railways, wherever possible, be properly equipped to handle standard steam road cars, if only in switching movements. He said that this would enable the roads to gain considerable traffic and in most cases would eventually lead to an interchange with the connecting steam roads.

On the same subject, F. D. Norveil, general freight and passenger agent Union Traction Company of Indiana, agreed with Mr. Beeler that the short haul transportation of both passengers and freight have been lost, except under certain conditions, by both the steam and electric lines. He therefore advocated concentration of effort on securing long haul traffic which cannot be successfully handled by automotive vehicles. "Much of the distant travel in what is known as Central Electric Traffic Association territory," he said, "can be attracted to the interurban lines by proper equipment and proper schedules. He added that the great industrial territory which is linked up by the network of interurban lines in the Central Association furnishes a secure foundation for building traffic, if consolidated operation is brought about to an extent which will enable a substantial improvement in service to be offered the shipper. Wherever the existing service has been properly organized, he maintained that the interurbans have established an enviable record of performance over hauls of 250 to 400 miles, which has been 50 per cent faster and more efficient than even the old line express companies have been able to render over the steam roads.

Other Connecting Links Proposed

Mr. Norveil suggested other connecting links which should be built to the existing lines in the territory, in addition to those suggested by Mr. Beeler. He also made a plea for the fullest possible co-operation by the various operating departments in so improving service to shippers that interurbans would inevitably receive the amount of business to which their potential shipping capacity entitled them.

Greater co-ordination of facilities and equipment as they exist today was held to be the greatest immediate problem of the lines in the Central territory by T. H. Stoffel, railway department, Westinghouse Electric & Manufacturing Company. He said there is much evidence that shippers generally appreciate the service which electric lines are rendering, but added that there is still much opportunity for bettering and improving the service and effecting economies in operation. Under existing conditions, costs are increased and the amount of interline freight movement is limited by the lack of proper and adequate freight stations and terminals, the almost total absence of accessible team tracks and sidings for loading and unloading freight and the development of straight carload tonnage, failure to install sidings at industrial plants to develop new business and reduce the handling through warehouses, and the inadequate supply of rolling stock for even normal requirements.

Bringing Back Prosperity to the Electric Railway Lines*

Prosperity Must Be Won Back by the Railway Men—Interstate Bus Regulation Must Come—Consolidation of Properties a Possible Solution

By Lucius S. Storrs
Managing Director American Electric Railway Association

DURING the last few days it has been my very great pleasure to visit various parts of your Middle Western country. Progress is the general keynote of your section, and yet among you the general conditions in our own industry are below the standard of other businesses. There doubtless are among you executives of properties which are suffering, particularly at this time, a feeling of discouragement. Temporarily, perhaps, it is justified. There may be properties that never will recover from the severe blows they are now receiving. But that the industry as a whole, or any great part of it, is doomed in this great heart of the Middle West, where scores of other businesses are going on to success, is unbelievable.

I base this statement on the very essentiality of our business. The majority of the public now is, and has been ever since our industry came into being, dependent on electric railway companies for transportation. That this demand for such a public service will continue is patent. Methods of providing transportation may change in certain details, but the mass of the people must continue to be served by a public service. Their rides must be provided and their commodities hauled. The organization best fitted to perform this service will be called upon to render it. We must and will remain that organization. Since in the long run service cannot be rendered without a fair profit, that profit must, of necessity, come too.

How soon that happy day will come depends, in a measure, on the willingness of the public, as represented by federal, state and local government officials, and ourselves to get together in a genuine spirit of co-operation. But most of all it depends upon ourselves. For we shall progress no faster than we make our problems plain to the public and show a readiness to work with its servants in bringing about solutions. On this also you may depend. For the most part our prosperity will not just come back. It will have to be won back, and we are the ones who will have to win it back.

Electric railways are rapidly absorbing scattering bus lines and creating new bus routes. This service rendered by electric lines has grown 129 per cent in the last year. More than 3,000 buses now are being operated in conjunction with electric cars.

Despite the 25,000 common carrier buses operated and the 18,000,000 automobiles in the United States, federal census figures show car riding is growing. Although the business of many industries in 1924 was off from 10 to 12 per cent, electric railways during that year carried practically the same number of passengers that they did during the previous year.

Can any one familiar with these facts consistently say that there is anything but a great future ahead for our industry? It isn't a frail plant to be toppled over by a strong wind, or withered by a summer sun. Rather it is a sturdy oak with roots buried deeply into the business, home and social life of the United States. Here and there you may find a branch that has been broken, but the heart of the oak remains firm.

The future of local transportation depends on the co-operation of the government and managements. Because in governmental action at present lies the immediate relief which we need and to which we are entitled, I wish to deal briefly with that. First, however, I wish to emphasize that government relief through legislation will come only in proportion to the extent to which we make our needs clear to the people's representatives in government. We cannot get relief, nor indeed are we entitled to it, if we depend on governmental agencies to discover our legislative needs and provide them on their own initiative. Our duty in this respect is clear. We must get into the van now and make our legislative fights honorably, continuously and fearlessly.

Today we are confronted with a situation in regard to the interstate regulation of buses which demands our immediate attention. The Supreme Court recently held that the state public service commissions have no control over the operation of interstate bus lines. Previously, the Interstate Commerce Commission had declined, on the ground that it was without authority, to assume control of bus lines in interstate traffic. As a result, today interstate buses, as unregulated common carriers, are competing on every hand with steam and electric railway common carriers, which long have been under governmental control.

This situation embraces danger not only to steam and electric roads but also to established bus lines of higher character, of which there are many in this country. Bus manufacturers and operators themselves are demanding regulatory legislation. Obviously, the present situation will not be permitted to continue. Probably this question will be taken up as quickly as any at the next session of Congress. Corrective legislation is certain to be passed, because its need cannot be discounted by even the most radical legislator. To permit such a condition to continue would strike at the foundation of all authority now vested in national and state regulatory bodies.

Despite the justice of appeals which

*Abstract of a paper presented before the Central Electric Railway Association, French Lick, Ind., June 2-4, 1925.

will be made for legislation, however, a great deal of educational work must be done. It is work which any transportation man can do with pride. Legislators will be eager to obtain unquestioned information regarding the facts. Hence it is the duty of every transportation man who believes in proper regulation, to his company and also to the public, to give generously of his time and effort in disseminating information on this question.

This is the immediate object before our industry, but a still greater obligation in relation to government activities rests upon us. That is obtaining general relief from our many onerous governmental burdens and interferences. In recent years there has been altogether too much legislation which imposes useless weights on transportation companies. As a result, our general transportation system in many cases has reached a state of exhaustion. It needs to have some of these loads lifted. Certainly no more should be added. It is plainly our duty to make every effort to demonstrate the unfairness of many of these burdens in the hope that legislation relieving us from them will be enacted.

All of us feel, of course, that we are carrying unjust tax burdens. And yet, I wonder if one of the reasons why we are borne down with them is that we have not made our situations clear. I have in mind particularly the paving taxes, which have been shackled on almost every city company in the United States since the inception of our industry. Latterly, about fifty companies have, through educating their legislators to the injustice of these taxes, freed themselves from them. Very few companies which have sought relief from this burden and made a clear demonstration of the fact that it was unjust have been denied relief. However, a very large number of companies which still are carrying the tax have either suffered in silence or made half-hearted or poorly organized efforts to bring about corrective legislation. Naturally, they are without relief.

Many similar levies were imposed on us in the old days when the assessment of public service corporation taxes was a favorite indoor sport, and there is no question but that we should be relieved of them. Our relief, however, will not come until we make intelligent and strenuous efforts toward getting it.

Whether it is the question of tax relief or some other form of legislation, we must approach our legislators openly, honorably and frequently, and see that our interests, which in the end are those of the great mass of people who use our services, are given fair treatment. They will not get it if we stay at home and wish for a change or send a few highly paid attorneys to represent us before legislative committees. Local legislative situations demand attention just as do those of the nation and states.

One of the gravest problems with which the industry has to cope is that of maintaining schedules in downtown streets. Where once this was a problem only in the larger cities, now, on account of lack of proper ordinances or inefficient enforcement, it has become an issue in almost every city and town in the United States. There is no doubt that both motor car owners and transportation companies have certain rights which should be granted by city officials, and, once granted, protected. No one will seriously contend that an electric car should not have the right-of-way over its tracks at all hours of the day and night. No other vehicle has any right in such circumstances to hold it up. Officials of every city should recognize this right and enforce it. Sooner or later this will be done throughout the United States, but, as in other cases where the co-operation of public servants is required, it will not be done unless we transportation men interest ourselves in seeing that it is done. It is our job to convince the car rider, the business man, the motorist and every one else that the interests of the community are best served by keeping traffic channels open. We can do it if we will put enough energy into the job.

The foregoing are only a few examples. In a measure the problems I have dealt with cannot be solved without the aid of persons who have no immediate monetary interest in our industry. Now, however, I want to turn to our own dooryard, or, indeed, the inside of our own house, and discuss particularly some duties that are incumbent upon us as a transportation family and on us alone.

Primarily, I want to urge the necessity of our rendering service in the broadest possible terms to the territories in which we operate. By that I mean rendering both passenger and freight service with the aid of electrically propelled cars, buses, trucks and whatever other means are necessary.

If we will fulfill all of the transportation requirements of our communities, none need have any qualms about our future success. If we render only a partial service and permit others to compel us to share the local transportation revenue with them, of course, we shall not fare well.

We have suffered much from competition throughout this country. Much of it has been unfair. You Middle Western operators, and particularly you men of Indiana, can appreciate the full significance of that statement. The wildcat bus and truck operators have preyed relentlessly on you for many years.

Here as elsewhere, however, in many instances, we have hesitated to broaden our service. There are many reasons for this. Many of them are sound from a business standpoint. Often, we have doubted if additional service was warranted. Again, some of us have hesitated to embrace new forms of transportation because we believed they would prove unnecessary or unprofitable. Competitors, sometimes encouraged by manufacturers, have not hesitated to enter the field.

Often they have been able to show a profit, and in almost every instance they have decreased our earnings. In this situation the question arises: What was and is the best thing to do? Shall we permit competition to enter in and take chances on its failing to make a profit, or shall we prevent competition by enlarging our own service and taking a gambling chance that the future will produce sufficient return to warrant our move? No broad, general rule for meeting such a situation can be laid down, but it is my conviction that in so far as possible we should so thoroughly cover our respective territories that competition at once will be discouraged.

In this connection, it may be interesting to review the code of principles regarding the respective places of the bus and the electric car in local transportation which recently were drafted by representatives of the automotive industry and the American Electric Railway Association and which were adopted by the executive committee last February.*

The representatives of the automotive industry on the committee which drafted these principles speak for the outstanding bus manufacturers of the country. They realize, I believe, that electric railway companies offer to them the greatest future dependable market for their product. Hence, they are subscribing to the constructive principles set forth. As time goes on, I believe that all bus manufacturers will recognize the soundness of these principles and govern themselves accordingly.

Consolidation of Middle Western Lines

Conditions on interurban properties, particularly, have changed greatly in recent years. They are bad in many places now, especially on properties which have depended largely on short-haul business. Those that have been able to take care of long-haul business have not been hit so hard.

The suggestion has been made that we should attack this problem by greater consolidation of effort, if not by actual consolidation of physical properties. Intelligent consolidated effort in any form means two things: First, lowered expense and, second, more business.

The first consideration in any consolidation agreement, of course, is whether it is physically possible. It would seem to be here. Many of your properties now connect. In fact, I understand that by the laying of a comparatively small number of miles of track you could link up the greatest interurban systems in Indiana, Illinois, Ohio and Kentucky and tap Missouri.

If an arrangement could be made whereby these properties, large and small, could be operated as one, there is no doubt that great operating economies could be effected. It also is needless for me to point out that under such a consolidated effort you would be working under distinct advantages in obtaining long-haul freight and passenger business. I understand that you have done well through your freight association in attracting a certain amount of long-haul business, but more can be done if the proper facilities are provided.

From a standpoint of financing, I believe, consolidation would prove of great value. You are suffering now, I understand, from a lack of cars with which to move freight. Of course, you

*See ELECTRIC RAILWAY JOURNAL, February 21, 1925, page 288.

cannot get freight to move unless you have facilities for moving it. It is a waste of time to solicit such business when your facilities are inadequate to render the best possible service.

The business is to be had. That goes without question. The tracks are available. But the responsible, consolidated organization for getting the business and the equipment for carrying it are not available. The answer to such a situation would seem plain.

Finally, let me urge the great need for every one of us in this industry to become greater salesmen for it. We have the human links of a very great chain, but it seems to me that those links in many cases have not been welded together as well as they might have been. If we will devote sufficient energy to it, every man in the electric railway business can be made a real salesman, not only for our immediate product but for the entire industry.

One thing more. Let the association help you. It is your hired man. It has facilities and information for aiding you and wants to place them at your disposal. It cannot possibly anticipate all of your needs. But if you will make them known all of us will try to supply them.

A Major Operation on the Interurbans*

Consolidation of the Existing Lines in the Middle West, with Possible Construction of Connecting Links, Should Make it Possible to Give a Much Improved Through Service at Lower Cost than with the Present Independent Systems

By John A. Beeler
Consulting Engineer, New York City

INTERURBAN railways, quite generally, are today in a difficult position. They are suffering from a continuing decrease in passenger riding. Unfortunately, the interurbans of this great central territory are no exception to this general condition. The reasons for the declining patronage are: The comparatively recent extensive inauguration of highway coach service, the constantly increasing use of private automobiles by the people who formerly made use of the electric railway facilities, and the general business depression especially noticeable throughout most of this section of the country.

The greatest loss in riding seems to apply to travel which involves a distance of 50 miles or less. To put the matter bluntly, we apparently must face the fact that the bulk of the short-haul transportation is lost to many of the interurban railways. The question is what is the best course for the interurbans to take. They have contributed so magnificently to the upbuilding of this central territory that surely they will not be permitted to fail and to be abandoned without first making every possible effort to determine whether there is not still a place in the general scheme of transportation where these existing facilities can be put to good use.

At present the interurban systems in the central territory are laid out primarily for comparatively short-haul traffic, both freight and passenger. They radiate out from the principal cities to communicate with the smaller surrounding cities and towns. When through business is undertaken, as it has been to a certain extent, it frequently involves joint operation over the lines of from three to six different companies. Thus, any matter pertaining to the operation of such service comes under the supervision of from three to six managements; it requires the attention of the operating, traffic, accounting, claims, and mechanical departments of from three to six organizations. When a claim is to be settled it involves a determination of which one, or several, of the three to six companies is responsible. This often results in an expenditure of time way beyond the value of the claim.

When a traffic man goes out to induce a shipper to send his materials the electric way the shipper may be disposed to give his business to this man, but he realizes that his product will be in the hands of this man's road only for a small portion of the journey and he wonders what treatment he will receive at the hands of the two to five other managements involved. He wonders where he should check up in case of delay in shipment or from what road he would receive settlement in case of damage or loss. He fears the complications and passing of responsibility which come from a multiplicity of small road managements. There is also the continuous difficulty of getting cars back to the owner road, as the per diem rate does not compensate the owner road to the same extent as the use of the car.

The foregoing leads up to two things:

First, that the opportunity, perhaps the only possibility, of continuing the interurban railways of the central territory on a successful basis lies in building up the long-haul service, both passenger and freight, between the principal centers.

Second, that this character of traffic can best be secured in a big way through either consolidation of these interconnected interurbans or at least by a pooling of facilities under a centralized management, which will in effect give the results of consolidation.

This may be an unpopular suggestion with some of the operating officials because it means the loss of jobs. But the time seems to be here when it is necessary to make a choice as between saving the job or saving the railway. To endeavor to save the job may result in the loss of both the railway and the job. As a parallel example, where would the great steam railroad systems such as the New York Central lines and the Pennsylvania lines be if they were operated as a series of small independent companies passing along their traffic from one to another.

Only in this central territory is the opportunity for consolidation and operation of all the interurban properties as one super system afforded. Here we already have the elements of what might readily be transformed into an electrified railroad system connecting such important terminals as Louisville, Indianapolis, Chicago, Cincinnati, Dayton, Toledo, Cleveland, Detroit, Jackson, Kalamazoo, Grand Rapids, Terre Haute, Columbus, Fort Wayne, etc.

By building a comparatively short connection between Crawfordsville, Ind., and Danville, Ill., this proposed system could be made to include the Illinois Traction System, extending westward to St. Louis. Similarly a line built from Elkhart, Ind., to Kalamazoo, Mich., would greatly increase the usefulness of the lines in Michigan for through business between Chicago and Michigan points and between Michigan points and towns in central Illinois and St. Louis.

To operate all these lines as a single system would accomplish two very important results, both having considerable influence toward making these properties pay. The first is that the economies which would be introduced are so obvious as hardly to require detailing. The management and overhead expense would be greatly reduced as there would be but one billing, one accounting department record, one claims record, one definite responsibility for damage or loss, one responsibility for planning facilities, one operating department, and so on. The second great advantage would be that the consolidated system would be able to offer its prospective customers the facilities of one great electrified railway system as against service over pieces of lines owned by the different companies, there now being 70 in this district.

*Abstract of a paper presented before the Central Electric Railway Association, French Lick, Ind., June 2-4, 1925.

COMING MEETINGS OF *Electric Railway and Allied Associations*

June 16-19—Society of Automotive Engineers, White Sulphur Springs, West Virginia.

June 22-26—American Institute of Electrical Engineers, Saratoga Springs, N. Y.

June 26-27—New York Electric Railway Association, Hotel Champlain, Bluff Point, N. Y.

July 22-25—Pacific Claim Agents' Association, Hotel Biltmore, Los Angeles, Cal.

August 12—Summer Outing at Pelham Bay Park, Metropolitan Section A.E.R.A.

August 13-14—Wisconsin Utilities Association, Hotel Wausau, Wausau, Wis.

Oct. 5-9—American Electric Railway Association, annual convention and exhibits, Young's Million Dollar Pier, Atlantic City, N. J.

Sept. 10—Central Electric Railway Master Mechanics Association, Grand Hotel, Anderson, Ind.

Under such a unification plan it would be possible to utilize the equipment of the unified property to better advantage. A greater flexibility should result with less idle time and less non-revenue mileage. There would also be the possibility of sleeper trains and other through passenger service that are not now practicable in view of the difficulties involved in getting numerous managements to subscribe to the required standards of equipment and service.

By a general introduction of light-weight modernized equipment of attractive design, it is possible not only to popularize the service but materially to reduce operating costs. With the bulk of the present heavy equipment retired an excellent opportunity is presented to standardize on cars. This means a great reduction in material and stores, shop expenses, maintenance, and power, and fewer cars to render the service.

As a concrete example of what might be accomplished by consolidation and the use of light-weight equipment, let us consider the State of Indiana. Here there are twenty companies operating nearly 1,800 miles of interurban electric lines. This is 10 per cent of the total interurban mileage of the United States, yet this state has but 1.2 per cent of the area and 2.7 per cent of the population of the country. At the present time operations of these lines are approximately as follows:

Total revenue	$16,000,000
Operating deductions	13,000,000
Gross income	$3,000,000
Fixed charges	4,000,000
Deficit	$1,000,000

Were all the roads in Indiana operated as one unit, as outlined herein, with light-weight interurban cars, employing the one-man principle wherever practicable, I estimate that a net saving of $2,000,000 would result after paying interest on the new equipment required. This would give a surplus of $1,000,000 instead of a deficit of $1,000,000, which should be used to provide a more reasonable allowance to cover renewals and retirements and improve the service generally. The interurbans in Indiana are fairly characteristic of those in the district and represent about one-third of the mileage and traffic in the district.

Generally speaking, the interurbans, especially those operating on a private right-of-way, should render through, fast, limited stop service. Co-ordinated with them, to care for the local service and cover the territory not otherwise served, a comprehensive system of coach and bus transportation under responsible, and preferably centralized, control should be maintained. Already in the State of Indiana alone 206 independent companies are now operating 760 coaches over 3,400 miles of route. Thus, the importance of co-ordination is seen if duplication of service is to be minimized and the public transportation requirements economically rendered.

These suggestions are made not without appreciation of the fact that there would be many problems to be worked out to accomplish the desired end. If the traffic developed takes on considerable proportions, it might be necessary to get new rights-of-way in or around some of the cities. But with so large a system, and with the greater standardization and increased responsibility which it would have, there doubtless would be possibilities of working out better arrangements for terminal entrances and steam railroad interchange which are not now available to the individual electric lines.

"Transportation is civilization," says one prominent New York editor. Any form of transit that is not progressing is gone just as surely as old Dobbin and the hitching post. Perhaps this is an idle dream, but the trend of business and future outlook under the present operations demand prompt and heroic treatment. In my opinion, the present managements will do well to give serious consideration to any workable plan, either by actual consolidation or at least of unified operation of an extensive part of the electric lines which now are comprised in the Central Electric Railway Association territory. Right now is the outstanding opportunity to transform these properties into a prosperous electrified major railroad system of no mean proportions.

Style in Car Design*

The Appearance of a Vehicle Has a Decided Influence in Determining Its Ride-Getting Power—The Author Shows How the Automotive Vehicle Has Had a Distinct Appeal of This Sort, and That Similar Principles Can Be Used in Electric Railway Cars

By Charles Gordon
Western Editor Electric Railway Journal

EVER since the automobile first began to make serious inroads on the business of local and interurban transportation the words comfort and appearance have been used frequently in discussions of electric railway equipment. Interest in this subject has grown steadily as the effect of the increased use of automobiles has been felt. During the last four or five years the bus has been improved rapidly and has taken its place as an important local transportation agency for certain conditions. As the application of automotive ideas has brought about marked improvements in the appearance, comfort and merchandising appeal of buses, railway car operators and builders alike have manifested an increasing tendency to be critical of past precedents and methods, and to feel that electric railway cars can be further improved so as to attract additional riders from those who at the present time are stretching their incomes to use automobiles for many unwarranted purposes. Consequently most recent discussions of ride merchandising include consideration of the elusive subject of building cars that will create a desire to ride.

Real progress comes when one sees beyond the restrictions of precedent. Let us examine for a moment some of the influences which have affected present-day vehicle design, with the object of discovering their origin, and of directing our attention into channels that will lead to new lines of thought. Both street cars and automobiles date back to the carriage or coach. When electricity was applied to street cars, power was no longer a limiting factor and their size grew steadily. Finally the double-truck car was introduced, and steam road practices began to creep in. Structural steel shapes and heavy forgings were widely used. Trucks and brake rigging also showed the same influence. As a result weights mounted rapidly until finally realization of the vicious circle produced by heavy cars, which in turn required heavier rail and more rigid roadbeds, resulted in a widespread demand for weight reduction. When the pendulum of opinion finally swung to the lightweight extreme, parts were cut in strength, as well as in weight, to a point which resulted in some reaction. However, the increased use of higher grade materials again makes possible still further weight reduction. But throughout this development the appearance of the vehicle has been a secondary consideration.

Automobile Designed for Appearance

The automobile since the start has remained a vehicle for individual or private transportation. For this reason, the element of appearance or style has been a very live factor ever since the early milestones of mechanical development were passed. Being primarily a pleasure vehicle, the element of sport has exerted a strong influence on body appearance. During the formative days, body designers — not engineers, but rather those interested in the sales value of the design—sought for effects which would typify rakishness and speed. The long streamlines of fast water craft furnished the desired *motif*, and soon the marine element made a distinct mark on automobile architecture. The engine was put out in front of the dash, the body was dropped lower, side doors were installed, hood lines were raised, sharp angles eliminated, and soon the streamlines of the modern automobile were evolved. Due to its direct automotive relationship, and the influence of automotive personnel, the bus is making rapid progress in the same direction.

The general effect produced by this attention to body lines and details of automotive vehicles has proved of direct merchandising value; in the one case on the sale of the vehicles and in the case of buses on the sale of rides in them. If there is any question of this value in your mind try to explain why you turn in a perfectly good and serviceable 1922 or 1923 model automobile to get a 1925 model, or why

*Abstract of a paper presented before the Central Electric Railway Association, French Lick, Ind., June 2-4, 1925.

passengers will flock to the longest, leanest and sportiest looking bus you can put on the road. For want of a better term, I have called this elusive merchandising appeal the appeal of "style."

"What is it," transportation men ask, "that makes people ride in buses?" Increased comfort doesn't explain it. Surely they are not safer than electric cars! Why will a passenger ride 50 miles in a low-hung bus that winds its way over a heavily traveled road or over congested and slippery pavements when a parallel interurban gets him to his destination just as fast or faster over a private right-of-way and at a lower fare?

"The rubber urge"; "comfortable seats"; "novelty"; "reduced noise"; "flexibility at terminals"—yes, part or all of these have some influence, but there is another very important factor. That is the appeal of "style." Once this factor in the sale of transportation is definitely recognized, an explanation for some of the inconsistent preferences exhibited by the purchasers of transportation is found, and as all good merchants should do, we may proceed intelligently about the business of satisfying the demand. That is one safe rule for building patronage in any business.

In one location which happens to occur to me as an illustration of a point I am making, a high-grade interurban line was paralleled by a bus competitor. The railway also put on buses, and soon an active fight for business developed. In the course of this struggle, three different types of buses were put on in rapid succession, each more rakish looking than its predecessor. During this time the interurban continued rendering service, which made the run in a shorter time and at a lower fare. As each new bus appeared, however, the passengers flocked to the most stylish and rakish looking model. Call that appeal what you will, I am referring to it as the appeal of style.

From this standpoint, then, the problem of car design consists of producing a visual invitation and creating an instinctive desire to ride. In general this might be expressed in a slightly different way by saying that the problem of building business on electric cars consists, to a large degree at least, of making it stylish to ride them.

Street cars must continue to haul the masses during the rush hours, and they must be designed and built with that end in view. But even the workman and mechanic are by no means beyond the influence of style. Large numbers of them have taken to the automobile for getting to and from their work. Not only does the railway lose the owner of the machine, but it also usually loses three or four additional passengers, who ride home with their more fortunate companion. And my point is that style is a potent factor in this use of the automobile by workmen.

I believe that serious consideration of this appeal to style, and the natural human satisfaction that comes from stepping into or out of a smart equipage, may be so capitalized in car design as to constitute a material aid in winning back former patronage and building new business. Street cars have, in a sense, been "over-engineered." By this I do not mean that there has been too much effort and time spent on the scientific employment of materials, or in the development of construction methods, but rather that utility and durability have been too much considered to the exclusion of appearance and merchandising appeal. The automobile industry has developed a brand of body designers who are primarily artists. They draw beautiful pictures of bodies that they think will appeal to the public, and it is then up to the engineers to find out how to build them. This usually is far from an easy task. Compromises must be made due to considerations of cost, durability and maintenance. These latter factors are of vital importance in the case of cars, but at the same time appearance must be made one of the primary considerations and not secondary, as has too frequently been the case in the past.

There seems to be no inherent reason why an electric car, operating on rails, cannot be given a rakish, stylish appearance. The structural problems involved seem fundamentally simpler than those encountered in an automotive vehicle, carrying its own power plant and designed to operate on the highway. But the desired results will be accomplished only by a courageous departure from existing precedent.

Grand Rapids Competition Attracts Attention

We have made considerable progress in this direction within recent years. During the past few months the Grand Rapids Railway, through the action of its vice-president and general manager, Mr. DeLamarter, has attracted the attention and interest of the entire industry by endeavoring to stimulate car design development through a form of competition between three car builders, who were given only general instructions as to the type of car desired, and were allowed more or less a free hand in developing sample cars which they considered best adapted to meet the requirement of building street car business. These cars, which have just been delivered, have been described in detail in recently published articles (see ELECTRIC RAILWAY JOURNAL, May 9, page 721; May 16, page 767, and May 23, page 807). They are now undergoing a series of tests, which will include an attempt to determine the preferences of the riding public of Grand Rapids. They include a number of interesting departures from previous practice, particularly along the lines of merchandising appeal, improved riding qualities and noise reduction.

There is a marked effort in all three cars to accentuate streamline effects. On one car a change from customary painting practice helps to carry out the effect sought. Instead of finishing the doors in varnish, or in one color of paint, the body colors both above and below the belt rail are carried across the doors and are split at the belt rail line so as to accentuate the effects produced by solid bands of color extending the entire length of the car. Still another interesting innovation consists of a skirt, similar to that sometimes used on buses, to conceal part of the trucks and apparatus under the car.

There is one phase of this experiment which deserves more than passing attention, and which has considerable significance in connection with the electric railway car-building business. This business is distinctive in that it is not a manufacturing business in which the product is developed, manufactured and sold. It is more in the nature of a contracting business in which the builder bids on specifications and in some cases more or less complete plans furnished by or developed for the customer in accordance with his ideas. This is particularly true of the larger properties in position to buy cars in comparatively large groups. The high cost of special development for a small order usually forces the small road to accept one of several designs developed for large systems, which the car builder offers with such minor modifications as will fit the requirements of the individual property interested.

This practice usually results in each large order being a complete development job to fit individual requirements. There is much less continuity of development than would be the case could several types of equipment be designed to fit certain general conditions and then manufactured in quantities and sold outright. In the manufacture of buses there is a distinct tendency in this latter direction, and the resulting progress that has been made in design indicates that under these conditions competition is allowed to have its fullest effect in stimulating development.

The Grand Rapids experiment is to some extent a step in this direction. It is apparent that each of the car builders involved, if convinced that a market existed for such cars on a considerable number of properties, would take advantage of the opportunity to develop its product gradually so as to include the best of available ideas.

The committee on unification of car design, at its last meeting in Chicago, considered this subject, and discussed ways and means in which this movement might be encouraged. At that meeting it was decided to investigate the possibility of collecting clearance data from the various roads of the country, with the object of determining the limiting dimensions that fixed the sizes of cars on various properties. It was the opinion of the committee that the savings which would result in the cost of equipment would justify considerable study of the possibilities in this direction.

The Car Builder's Car*

By GEORGE L. KIPPENBERGER
Assistant General Manager
St. Louis Car Company

IN HIS paper on "Style in Car Design," Mr. Gordon has pointed to facts which may be deemed fanciful by some of us, but which are nevertheless timely and fitting for thoughtful consideration.

Mr. DeLamarter, in planning his experiment, in no sense lost sight of the

*Abstract of written discussion before the Central Electric Railway Association, French Lick, Ind., June 2-4, 1925.

fact that the sturdy, conventional, present-day electric car on rails is the only effective medium for taking care of peak-hour, mass transportation. Other types of vehicles, including buses, cannot. This need not preclude the possible need of a de luxe type of "electric rail coach."

Regardless of opinion, the paper under discussion indicates that this question is a live topic for consideration at this particular time. The present-day riding public—product of this advanced age—is, we may say, fastidious. A natural incentive, therefore, inclines the owners of rapid transit, a most vital need of the age, highly to improve and embellish their various vehicles of transportation, in a strained effort to keep pace with the discriminating sense and tastes of the times. It would seem logical, therefore, for some far-seeing individual to conceive of and initiate into use a new type of vehicle, electrically propelled on rails, extreme in design, and differing radically, in form and structure, from that now in common use, and at the same time conforming in "style" and fashioned in pattern to the cravings of this "de luxe" age.

This incentive, if followed, would lead to the perfection of an "electric rail coach" of such body lines, appointments and ease of carriage that prospective patrons will instinctively become attracted to its use as a matter of choice and preference.

The three sample cars recently designed for the Grand Rapids Railway, by as many different car builders, are not extremely radical in the full sense of the word. In the sense that they are fully equipped with the very latest improved devices, are as easy riding and silent running as the art will permit, have faint suggestions of a few automotive ideas, and are pleasingly and highly decorated, they typify an approach leading to the ideal in the mind of the manager of that railway.

The topic under discussion leads to the thought: Will a radically changed type of car, of a "style" conforming to the dominating tastes of the present-day riding public, pay its way? Will first cost, maintenance, and limited carrying capacity overbalance earning power?

The advocates of a radically changed car contend that the appeal of the embellished vehicle will attract fares new and old, now lost to competing vehicles. In other words, it is contended that the people will patronize a vehicle which caters to their taste, and are willing to pay to be satisfied.

The automotive industry expends millions annually in engineering research and plans for betterments to satisfy public demands. One concern alone expended $5,000,000 on the single item of developing a more perfect radiating system. The allied electric railway industries expend annually a good sum of money upon development and in the way of improving devices and accessories. Research engineering work of this nature, however, is generally scattered and done in a diversified way, without any concentrated effort to perfect a particular item or solve a difficult problem. The expenditures in money, time and effort made by our industry to accomplish these ends admittedly are in no way comparable and commensurate with like expenditures made for the same purpose by the automotive industry.

If there is a place for the radically changed street car or "electric rail coach" today, why has not the car building industry initiated its use by offering it to the trade? Permit me to illustrate my impression in answer to that query by relating an incident:

Upon delivery of the three different sample cars to the Grand Rapids Railway, the general manager invited quite a number of railway men from far and near to witness the first test trial runs. One of the group making the inspection said: "This is the first time the *car builders* have built a car for the car rider." His statement was immediately corrected to, "This is the first time the car builder *has had an opportunity* to build a car for the car rider." Mr. DeLamarter's innovation gave the car builders an opportunity more or less free to build a car to attract and please the public.

Mr. Gordon, in his paper, has pointed to one of the reasons why the design of the street car has not developed and advanced, and seemingly has not kept equal pace with competing vehicles, along the lines we are discussing. The car building plant is a contract shop. We contract to build on specifications—the master mechanic's specifications—and the result is a master mechanic's car, well built, if you please, from a maintenance standpoint and efficient for handling passengers. From this discussion, however, we sense that in this day and age passengers want something more than being safely handled.

Were it possible for the car builder to merchandise his car—his *standard* car—if we dare mention the word standard in connection with cars before railway men—the builder would have opportunity and incentive constantly to improve and develop style and design. Likewise he would then have the required incentive which that opportunity afforded of improving facilities needed to reduce costs of the various fabricating operations involved in his design. The design being his standard for common merchandising, he could fabricate most of the parts for stock, in quantity production, at reduced costs. Building his standard car under his own specifications, he would be free to put quality into his work and place the stamp of individuality on his product, even though he built several models.

On the other hand, the railway manager, usually not the railway owner, although recognizing the public trend, has a sense of responsibility to stockholding interests and may not be sufficiently brave or free to experiment and depart from the common practice of equipping his line with cars built to withstand rough usage and designed primarily for durability.

In common practice the car builder is expected to build a car that will endure four or five times longer than a bus or automotive vehicle which meets the demand for stylish appearance. As the public is the final arbiter, we may expect the public reaction to the Grand Rapids experiment to have a far-reaching effect. Favorable reception of the sample cars submitted may be expected to stimulate effort in the designing of cars along the same general lines that will combine durable qualities with artistic effects.

Executive Committee C.E.R.A.

W. S. RODGER, general traffic manager Detroit United Railways, presented a report of a special committee of the Central Electric Railway Traffic Association, recommending by a majority vote of the committee the apportionment of loss and damage claims on a mileage basis between interested roads, instead of on a revenue basis. After some discussion, the executive committee voted to adopt this recommendation, even though some members favored the revenue basis of distribution.

On the invitation of President Coates, Lucius S. Storrs, managing director American Electric Railway Association, addressed the committee briefly, and offered the Central Association the cooperation of headquarters and of the American Association.

It was decided to hold the annual meeting on Jan. 28 and 29 at French Lick. This date is fixed by the constitution, and as the French Lick Springs Hotel had offered the same schedule of special rates as were extended for the summer meeting, it was decided that this would be the best location.

Executive Committee C.E.R.A.

Weight Equipment*

By Howard Gass
St. Louis Car Company.

TO THE minds of mechanical men improvement means that combination which will result in low maintenance costs and reduction of equipment failures. To the transportation man, improvement means low operating cost, faster passenger interchange, faster acceleration and deceleration and consequently higher schedule speeds. To the purchasing agent it means lower first cost and reduced investment.

In times past most equipment was built in accordance with the ideas of the master mechanics and operating officials. Prime consideration was given to operating and maintenance costs, with some slight idea of appearance, but without any specific consideration of the rider's views and taste in the matter. Cars were built according to the operating requirements, but without much regard for the views of passengers. Long-established precedent was an important factor in fixing the type of equipment specified.

Changes designed to improve riding and comfort were judged primarily from the standpoint of maintenance cost and were usually rejected in favor of older and more familiar forms of construction.

The introduction and development of the bus to meet the desires and fancy of the public have led to a rapidly changing point of view. Our indifference to

*Abstract of paper read before annual meeting Mid-West Electric Railway Association, Kansas City, Mo., May 25-26, 1925.

the public's preferences in the matter of equipment has been brought about by our proximity to the problems of operation and maintenance and the inability to view the business of transportation with sufficient perspective. To accomplish this it will be necessary for each department to compromise in favor of pleasing the car rider. Lowest possible maintenance cost dictates substantial construction, heavy cars, large power and brake units—all tending against high schedule speeds. Operating economy requires light weight and high schedule speed. The public demands both comfort and speed. Present-day improvements may be expected to be along the lines of slight additional increases in weight, higher schedule speeds, and concentrated attention to passenger comfort.

Today we have single-truck cars seating 30 people, making a schedule speed of 10 to 12 m.p.h., and weighing 16,000 lb. Double-truck cars are being built to seat 44 passengers, which make schedule speeds of 10 to 12 m.p.h. and weigh 25,000 to 30,000 lb. Lightweight suburban cars seat from 45 to 50 passengers, make 20 to 22 m.p.h. schedule speed and weigh 30,000 to 36,000 lb. Cars of the same capacity and designed for speeds of 30 to 35 m.p.h. weigh from 36,000 to 40,000 lb. This equipment shows a marked reduction in weight in comparison with cars for similar service built ten years ago.

Many features now being added to cars to increase safety, comfort convenience and speed of handling passengers tend to increase the weight of cars. Pneumatic operation of many auxiliaries causes a considerable increase in the weight of air equipment over that required for brakes alone.

Weight reductions have been cumulative. Reduced body weight has allowed the use of smaller motors and this in turn has permitted material reductions in truck weights. Use of higher grade materials has also aided in this process. Further progress in this direction is the probable method which will be used for any further weight reduction.

During recent developments increased attention has been directed to the use of aluminum and its alloys. This material not only reduces weight, but it also has a pleasing appearance as a finish. It does not ring like steel and consequently its use will tend to reduce noise. In the design of car and truck structures, however, deflection is of importance as well as strength, and this factor must be considered. Combination materials like plywood with steel faces are also being produced for car construction, but problems are presented to the builder in the application of such materials.

Wood still offers the car builder many advantages over other materials for body construction. A $\frac{1}{8}$-in. steel plate applied to the side of a car with rivets will show dents at the rivets and buckles between the stiffening members. A $\frac{5}{8}$-in. wood sheathing will weigh no more than the $\frac{1}{8}$-in. steel sheet, will have no buckles and will give the same strength. Similar comparisons may be carried through other members of the car framing.

In the sample car recently built by the St. Louis Car Company for Grand Rapids the underframe is of steel, the sides are composed of steel sheets, and the floor, posts, roof, sash and doors are all of wood. Except at the bolster, a very light wood post is sufficient to stiffen the side girder, and the bolsters can be stiffened by light drawn-steel sections. Instead of being supported by steel carlines, which must necessarily carry wood furring for the attachment of the wood, the roof is supported on wood carlines only with an upper and lower member tied at suitable points with spacing blocks. This construction is in some respects similar to that in an airplane wing. Furring strips are of selected hard wood.

The wood posts have sufficient section to permit running bolts through them without destroying their usefulness as girder stiffeners. They are cut down at the window sill so as to give the maximum glass space for vision. The upper portion is increased in size to provide a secure fastening for the letter panel and the roof carlines. The light wood top plate forms a spacer for the posts, a stiffener for the letterboard and a firm connection for the roof. The latter is of the arch type and will carry its own weight, the only requirement being that the posts shall have sufficient stiffness to resist the tendency of the arch to flatten.

The ends of the car, which are subject to collision shocks, have a steel facing over an oak crown. In this we are following the practice of the ship builder, who backs his heavy armor with an oak frame to absorb and distribute shell impact on the hard steel face.. For the interior, woods of beautiful grain are selected.

For the trucks, to reduce vibration, steel rims and steel hubs with wood filling plates are used. The hub and rim have suitable copper connections for the transmission of the ground circuit to the rail. Brake noises are reduced by the use of fabric-lined clasp brakes, using material with high coefficient of friction and heat resistance. Motors were specially selected to deliver their maximum power at the same speed, so that there should be no whirr or humming noises set up while in operation.

Seats are covered with imitation leather and have deep spring cushions and backs, so that the rider has all the comfort he could expect in a moderate priced automobile. In spite of the many innovations and high-grade materials used on this car, the purchaser is receiving a unit at a cost very slightly if any in excess of that which he has been accustomed to pay, but which will effect marked economies in the cost of operation.

Oils and Pigments Used in Car Painting*

By H. G. Noble

Superintendent Everett Shops,
Boston Elevated Railway, Boston, Mass.

PIGMENTS most used for car painting are lead, carbon, zinc and lithopone. The old-fashioned idea that lead alone is the only satisfactory pigment for paint has been disapproved. In many instances other pigments do quite as well and in some cases produce a paint which does better than straight lead. For outside work, lead in combination with other pigments is still the most generally used. Lead alone chalks too much and does not give the maximum whiteness due to the chalky surface picking up dust, etc. Zinc oxide, which is today almost universally used in combination with lead and other pigments, is the finest of all and very white in color. Owing to its extreme fineness, it requires more oil than any other white pigment to become fit for the brush. In 100 lb. of the zinc oxide paint ready for use, there are 46 lb. of oil to 54 lb. of zinc, while in the same proportion in corroded white lead of the same consistency there are 76 lb. of pigment to 24 lb. of oil. Owing to the fact that zinc oxide is not affected by any gases present in the atmosphere and that it does not affect other pigments with which it has been mixed, it is very extensively used in high-grade white paint and enamel for both inside and outside use.

Carbon pigments are quite extensively used in the manufacture of metal protective paints. The carbon blacks are practically pure carbon. They comprise lamp black, a specially prepared soot from oil lamps, gas black from natural gas, and graphite, which is a natural product now also produced artificially by means of an electric furnace. These pigments are chemically inert. The particles are extremely fine, and their specific gravity low. Consequently, they require a large amount of oil to make them fit for the brush. Their covering and wearing capacity is a striking example of the durability of inert pigments when used in painting. As proof of their durability, lampblack lettering on old signs has been frequently known to stand out in relief after the wood surrounding it has been deeply worn away by the elements. One reason lamp blacks are so permanent is that they have no drying properties like lead, and therefore prevent the burning up of the oil film due to progressive oxidation.

Lithopone is essentially a combination of co-precipitated zinc sulphate and barium sulphate, which reacts chemically to form a compound, roughly making 30 per cent zinc sulphate and 70 per cent barium sulphate. This pigment is very fine and white, and if properly made has excellent body and other very valuable properties as a pigment. It darkens in the sunlight and recovers its color in the dark. Most of the lithopone now made is practically lightproof. Lithopone is used to make interior paints, first coat or primer whites, flat whites, and all finishes, and the lighter shades of floor plaint. It is very extensively used in combination with zinc to make the so-called mill white enamel.

*Abstract of a paper presented before the New England Street Railway Club, Boston, Mass., May 28, 1925.

Earth colors are compounds found as deposits in the earth and are utilized as pigments, either in their natural state or after grinding. The principal varieties are the mineral brown, ochres, umbers, siennas, natural iron oxides, and mineral black. Of the earth pigments most commonly brought before the layman are the iron oxides which range in color from warm brown to a brilliant scarlet, depending upon the composition of the original mineral and the degree of oxidation. The thousands of freight cars in operation on the various railroads, which are all painted with iron oxide paint, give a good idea of the enormous quantity of this pigment which is used. Venetian red, one of the most popular and durable of red oxides, is made in large quantities by roasting copperas, the byproduct from pickling iron. Most of the Venetian reds contain calcium sulphate, as the copperas is generally mixed with lime before roasting.

Chemical colors are pigments produced by chemical action of one substance (usually in solution) upon another resulting in the precipitation of a colored compound. Linseed oil is usually preferred for the manufacture of outside paint and enamel. It is the most abundantly obtainable of all oil and its cost is usually moderate. Results obtained with it are more uniform than with any other oil, and it produces a very tough film, which allows for the expansion and contraction of the surface to which it has been applied. Linseed and perilla are drying oils. Chinawood or tung oil is used more for the manufacture of waterproof varnishes, floor paints and enamels than in paint. It is also used to a considerable extent in the making of flat wall finishes. The oil requires special heat treatment.

Turpentine or thinners are added to paint for the mechanical effect, to facilitate the labor of spreading, to reduce excessive amounts of oil, to hasten setting of paint, to assist the penetration of the priming coat, to reduce the gloss of the undercoat and thus improve the adhesion of subsequent coats and to destroy the gloss in a finishing coat where an eggshell finishing coat is desired. For this class of work, turpentine, wood turpentine, substitute turpentine, benzine and mineral spirits are most generally used. The greatly decreasing supply of pure spirits of turpentine has forced customers into the adoption of substitutes made from mineral oils, and experience seems to show that in the majority of cases a good substitute turpentine answers quite as well as pure spirits. The fact that both turpentine and turpentine substitutes are volatiles and on exposure to the air evaporate rapidly and pass out of the paint, having no real effect on the paint film, leads to the conclusion that, in the majority of cases, one answers as well as the other.

In the past, when labor was cheap and time meant nothing, it was customary to apply a flat color and then apply a coat of rubbing varnish when painting the cars. After rubbing, a coat of finishing varnish was applied to obtain a high gloss finished job. With labor costs high and time a big item, it has become necessary to produce a finish which will cut down labor costs and save time. The result is the perfection of an enamel paint, which is a combination of color and varnish properly blended and which combine two operations in one. Enamels, like paints, are composed of liquids and pigments. The pigments used in making enamels are a great deal the same as those used in making paints, except that zinc is used almost entirely in place of the lead in producing the white. Practically all of the high-grade white enamels contain nothing but zinc oxide, while the colored enamels may be a combination of zinc and a predetermined coloring pigment or it may be a straight color pigment.

The vehicle in an enamel is a varnish which is a combination of varnish gum and oil. Several grades of this varnish are used in making enamels. These range from a short oil rosin varnish up to a long oil Kauri gum varnish. The short oil enamels are very quick drying and do not render long service. The long oil enamels are slower drying, easier working and very long lived.

The oils used in making the lighter colored enamels must be bleached before being made into varnish vehicle, as it is really the oil or vehicle in any paint or enamel which gives it its life or wearing properties. A long oil enamel for all exposed surfaces is really the only satisfactory material to use, as it costs just as much and more to apply cheap paint or enamel than to apply a first quality product.

Undercoats Deserve Attention

Paint or enamel may be applied by brush, spray or dipping. There are great differences of opinion as to the best methods of application; each, however, has its place. Too much emphasis cannot be made as to the proper preparation of the job on hand and the proper application of the undercoats, for unless the surface and undercoats are right, the finish coat, no matter how good, will fail. We never apply paint to unseasoned wood or damp or wet surfaces and shellac all sappy spots in new wood. All surfaces should be thoroughly cleaned before repainting, and metal surfaces must be thoroughly brushed off to remove rust before painting. Sufficient time must be allowed before the application of the various coats. When using a product of some paint manufacturer, the instructions given on the container should be followed carefully. The manufacturer has probably been in the business for years and is just as anxious as you are to have the material give a satisfactory job.

I have often been asked whether I do not think better results can be obtained by making up our own formulas and putting them out for bids. To this I can answer, positively, no. For in putting out specifications for bids, the unscrupulous are allowed to quote against the honest manufacturer, and the man buying the goods can only place his orders with the lowest bidder. To add to this, the minute you accept a paint made under specification different from any manufacturer, his responsibility ceases. He will simply tell you if the paint fails that it was made in accordance with your specifications, and if it has failed it is up to you. Even a chemical analysis of a specification paint will not be of assistance; it will only indicate to the chemist whether the paint is properly compounded, but the method of preparation, which is quite as important as the composition, will not be known.

Central Master Mechanics Meet at French Lick, Ind.

PROGRESS reports of various committees were made at a short business meeting of the Central Electric Railway Master Mechanics Association, held at French Lick, Ind., during the annual summer meeting of the Central Electric Railway Association. These included reports from the committees on standards, uniform charges for the repair in interchanged cars, United States safety appliances, program, and membership.

As a result of a careful search of past records, the committee on standards had compiled a record of all previous equipment standards of the Central Association. These were outlined in the report, from which it developed that most of these standards are quite old and in many cases obsolete. The committee was commended for its careful work, and it was the opinion of the meeting that all standards which have become obsolete should be weeded out and discarded. P. V. C. See, superintendent of equipment Northern Ohio Traction & Light Company, Akron, Ohio, suggested that a standard of marking for freight equipment in the association territory would be very desirable, and that a study of this matter might properly be made by the standards committee. The subject was referred to the committee.

Discussion took place regarding the need for running boards on top of electric railway freight cars, and of ladders on the sides of the cars. It was pointed out that although the electric lines in the Central territory have had no particular difficulty during many years of operation, there is a potential danger until a full understanding is obtained with the Interstate Commerce Commission relative to electric railway conditions, and necessary modifications made of the rulings of the commission to take care of electric railway conditions. It was decided that when the committee has completed its report the association should consider the best course to follow in clearing up this situation.

The progress report of the committee on uniform repair charges stated that this committee is compiling cost data to be used as the basis for making up a schedule of charges. Considerable study has been given the matter of labor costs, with the object of selecting a rate which would be equitable under the variable wage scales on the various roads. A tentative rate of 70 cents per hour is being considered.

The next regular meeting of the association will be held at the Grand Hotel in Anderson, Ind., on Sept. 10, 1925. This is just one day before the meeting of the Central Electric Railway Traffic Association, which is to be held at Webster Lake, Ind., on Sept. 11 and 12.

American Association News

Executive Committee

MONTREAL was the place of meeting of the executive committee of the American Electric Railway Association held on June 10, the members being guests of Col. J. E. Hutcheson of the Montreal Tramways. Members present were: President J. N. Shannahan, Managing Director L. S. Storrs, Executive Secretary J. W. Welsh, E. P. Stevens, E. P. Walker, L. H. Palmer, W. H. Sawyer, C. E. Morgan, C. E. Stephens representing F. D. Shute, F. R. Coates, H. P. Briggs, T. C. Cherry, C. S. Hawley, A. A. Hale and L. F. Gould. Guests present were Labert St. Clair, J. W. Lofton, H. L. Brown and Morris Buck.

After approval of the minutes of the last meeting, Mr. Welsh read the revised budget for the year. He stated that the association is doing somewhat better than was anticipated in view of the expenditures made necessary by its increased activities, and that there probably will be a small surplus at the end of the year. Dues, he said, are coming in in good shape. Reports of the various committees are being prepared and will probably be ready for printing by July 1.

Mr. Stevens read the report of the auditors for the association. All accounts were found in good condition. The report of this committee was approved and placed on file.

Mr. Storrs reported on the status of motor vehicle common carrier legislation.

For the subjects and meetings committee, Mr. Sawyer explained the status of the program for the October convention. Mr. Coates proposed the use of the Hippodrome in place of the Greek Temple for holding meetings. After some discussion, it was decided that, since space for exhibits had been sold with the understanding that all meetings would be held at the end of the pier, no change be made in the meeting places for this year. President Shannahan suggested that in the past the attempt had been made to place too many subjects on the program. Accordingly, he thought that the program should be restricted this year as far as consistent with the idea of getting better quality of papers and discussions.

For the publicity committee, Mr. Welsh stated that it has assisted in the preparation of a number of articles by special writers dealing with electric railways. A booklet telling of the various kinds of work available in the industry for young men has been prepared for sending to the colleges for distribution.

Mr. Palmer read the report of the committee on publications, giving the present status of Aera. This report was adopted.

Mr. Storrs reported regarding the matter of handling funds for the Advisory Council. The council has passed a resolution recommending that such funds be kept in a separate account, from which payments should be made with the approval of the executive committee and the managing director. This was approved by the executive committee. Mr. Shannahan told of the method which has been adopted for solicitation of funds for the Advisory Council. It has been planned to request each member company to make a voluntary contribution. After some discussion, Mr. Sawyer and Mr. Coates were appointed a committee to solicit subscriptions.

Mr. Palmer, for the committee on company and associate membership, stated that seven new members have applied for admission. These were the Warren Street Railway, the General Engineering & Management Company, the Adams & Westlake Company, the Lovejoy Manufacturing Company, John Lucas & Company, the Norma-Hoffmann Bearings Company, and the Pennsylvania Rubber Company. All of these applicants were elected.

For the committee on individual membership, Mr. Morgan stated that the membership has had a net increase of five. The Metropolitan Section, he said, now has over 1,000 members.

Mr. Morgan, on behalf of the exhibit committee, stated that the space sold this year to date is 33,304 sq.ft., as compared with 29,936 sq.ft. at the corresponding time last year. Space under the control of the exhibit committee has been reserved for the display of double-deck buses near the Shelburne Hotel. The relative space being used for automotive equipment this year will be approximately the same as it was last year.

The following nominating committee was announced by President Shannahan: T. N. McCarter, chairman; C. D. Emmons, J. H. McGraw, F. W. Coen, Thomas Fitzgerald, Richard Waterhouse and G. J. Kuhrts. The appointment of this committee was approved.

Mr. Stevens reported on the status of referendum 45 of the United States Chamber of Commerce and Mr. Welsh read Mr. Gadsden's report on referendum 46. His report was accepted.

The committee on revision of the constitution presented a report containing several proposed changes in the scope of the association to include other forms of transportation, such as the motor bus, the trolley bus and the gas rail car, when operated by or in conjunction with electric railway companies. Changes to provide for the Advisory Council and the managing director also are included. These were read by Mr. Sawyer of the committee, in the absence of Chairman Emmons. After adoption by sections, the entire constitution was approved for submission to the membership. A vote of thanks was given to the committee for the excellent work it has done.

On motion of Mr. Sawyer, a resolution extending the thanks of the executive committee to Colonel Hutcheson for his hospitality in entertaining the committee was passed unanimously.

It was decided that the next regular meeting of the executive committee would be held at Atlantic City next October, in connection with the convention.

Way Matters

REPORTS of various sub-committees were received and adopted at a two-day meeting of the committee on way matters held in New York City June 8 and 9. In the matter of the review of existing standards there was some discussion regarding the iron binding under special trackwork pieces. The committee agreed to recommend the continuation of the study of this subject to the ensuing committee and voted to request the ensuing committee to consider redrawing such plans of other associations as are required for the manual.

A brief report on the subject of standardization of frogs and switches was presented. Little progress has been made since the last meeting. A comprehensive report on surface hardening of rails was adopted. Some changes were made in the report on design and specifications for railroad crossings. It was then adopted.

Reduction of noise in car operation was discussed at considerable length by the committee and some amendments made to the report, after which it was adopted. The committee voted to recommend the continuation of the study of the subject by a special joint committee of way and equipment engineers. A report on the design of substitute ties was amended and adopted.

Information presented on the subject of arc welding repairs to tracks and welding rod specifications caused a lengthy discussion. The committee voted to recommend the publication of the American Welding Society specifications in the report and to continue the study of the subject.

Tolerances and the milling of rail ends were discussed in connection with the work of the special committee to confer with the American Society for Testing Materials. The way committee voted to oppose increasing of the carbon in the girder rail specifications and decided if higher carbon was desired by the steam roads they should prepare a class "C" specification and submit same to A. E. R. E. A. and the A. S. T. M. in the regular way. No report was submitted on the design of limit of wear gage, wheel mounting, etc., because the sub-committee is waiting for information from the equipment committee.

Welded rail joint tests now being made were considered. The committee on way matters decided to take no action on the question of modification of the repeated impact tests, as it was felt the committee on welded rail joints was handling the matter satisfactorily.

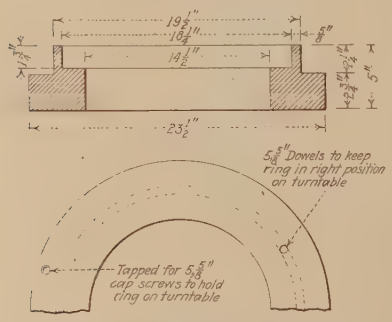
Members present were: E. M. T. Egbert & H. Haylow, F. S. Reynolds, C. A. Alden, C. L. Hawkins, V. Angerer, C. C. Rehfuss, J. S. Tyrrell, D. J. Graham, M. M. Johnston, P. J. Lavan, E. L. Lockman, H. E. Bean, W. W. Wysor, C. F. Gailor, A. T. Spencer, S. H. Dalgleish, sponsor, and H. H. George, chairman.

Maintenance of Equipment

Boring Armature Bearing Housings

SPECIAL precautions are taken in boring out the bearing fits in the housings of Westinghouse type 306 CV railway motors at the Utica Park shops of the New York State Railways. The work is done on a large Niles-Bement-Pond boring mill.

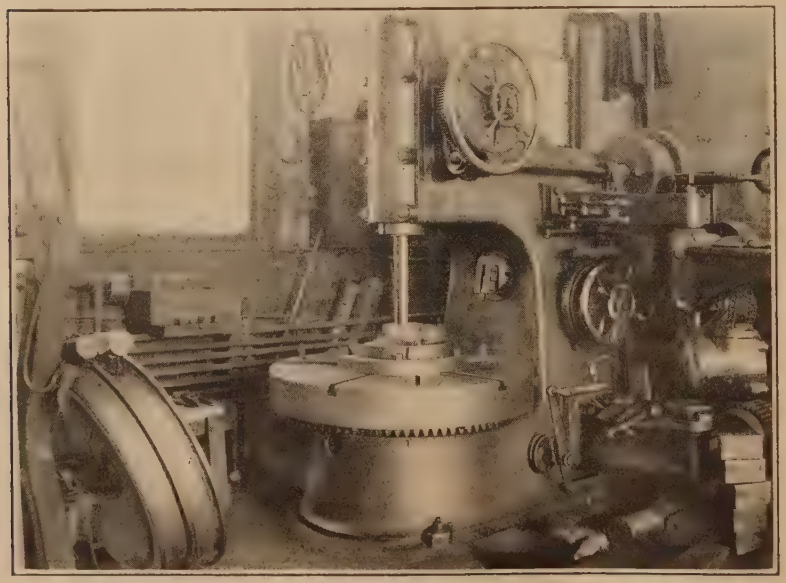
The feature is the fixture used to hold the housings in alignment. The



Ring Fixture for Holding Housings Accurately During Boring Operation

same fixture is used for both the pinion-end and commutator-end housings. It consists of a cast-steel ring with different diameters provided to fit the two housings. The pinion-end housing is bolted to the ring having a diameter of 18¼ in., and the inner ring, 14½ in. diameter, is used for bolting the commutator-end housings in position. The same holes are used for bolting the housings to the ring as are used for holding them in the motor frame. The ring is held in position on the turning table of the boring mill by five ⅝-in. dowel pins and five ⅝-in. cap screws.

The boring bar has a micrometer adjustment for the cutting tool, so that accurate boring is assured. A bushing is provided in the jig for the bottom end of the boring bar to prevent chattering and insure accurate alignment.



Boring a Pinion-End Housing in the Utica Park Shops of the New York State Railways

This Cabinet, Built Along a Wall of the Carpenter Repair Shop in Dallas, Provides a Place for Workmen to Keep Tools and Supplies

Cabinet for Workmen's Tools and Supplies

BY J. L. BROWN
Master Mechanic Dallas Railway, Dallas, Tex.

SUPPLIES, tools and tool boxes used by carpenters in the car repair shop usually present a difficult problem from the standpoint of keeping the repair shop looking neat and clean. At the same time, some provision must be made to give these men a place to lock up tools that are their personal property or that are assigned to them. As a result, tool boxes or cabinets are sometimes scattered about near the jobs on which men are working, and continual vigilance is necessary to prevent a very disorderly general appearance.

Some time ago the tool cabinet shown in the accompanying illustration was built in the shops of the Dallas Railway. Each of the compartments is in two sections. The larger one, above, is used for tools, while the smaller cabinet, below, is used for storing screws and other miscellaneous supplies that have been drawn out of stock for a particular job.

The cabinet is built along the wall at one side of the repair shop, where it is readily accessible and handy for the men working on cars in the shop. Each section is provided with locks, so that the contents cannot be disturbed.

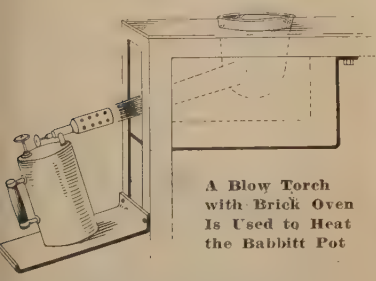
By insisting that men keep their supplies in the lockers provided for them, the general appearance of the

hop is improved very much over revious conditions. The total cost f building the cabinet was small and s considered well justified from the tandpoint of good housekeeping.

Babbitted Bearings Give Long Life

SIMPLE apparatus for rebabbitting bearings has given satisactory results on the Poughkeepsie Wappingers Falls Railway, Poughkeepsie, N. Y. Because this company perates a total of only about 25 cars he expense of installing elaborate quipment for babbitting would not e justified. A gasoline blow torch ounted on a shelf alongside the abbitting table is used to heat the etal. The latter is contained in a abbitt pot of the ordinary type susended by its upper rim from the urface of the table. Thus the lower art of the bucket extends under the able, where a fire-brick oven has

Bearings Removed from the Mandrel by This Clamp Are Immediately Quenched



A Blow Torch with Brick Oven Is Used to Heat the Babbitt Pot

been constructed on a shelf. An opening in the fire brick allows the flame of the blow torch to be directed against the under part of the bucket. The arrangement of this apparatus is shown in an accompanying diagram.

A hinged holder has been arranged to fit around a bearing to be babbitted. The latter is slipped down over a mandrel and held in place by the clamp as shown in an accompanying illustration. Handles are provided so that the babbitted bearing can be removed from the mandrel and immediately quenched in a tub of water standing alongside. Bearings rebabbitted in this way give an average life of 75,000 miles, approximately as good as that of new bearings.

Wire Is Kept Under Tension in Rewinding Armatures in the Homewood Shops of the Pittsburgh Railways

Keeping Tension on Armature Wire

COILED steel springs arranged as shown in the accompanying illustration are used in the Homewood shops of the Pittsburgh Railways to keep tension on the wire used in winding armatures. This wire is carried on reels mounted on horizontal rods. A double set of reels is used, one above the other. These are arranged in groups of two, three or four, according to the type of armature. The wires pass through a series of pulleys and then through a spacing rod. The pulleys are fastened to the floor by the springs, and similar springs are attached to bands passing over the reels. With this arrangement the winder must pull the wire against a steady but slight resistance. The reels are prevented by the braking device from revolving too rapidly and allowing the wire to slack off.

Outdoor Storage Rack for Bar Stock

By J. T. Porter
Master Mechanic Northern Texas Traction Company, Fort Worth, Tex.

STORAGE of bar stock usually takes a considerable amount of valuable space in the average railway blacksmith shop or storeroom. In addition this material is difficult to store so that it is readily accessible.

In the accompanying illustration

This Outdoor Storage Rack in Fort Worth Provides a Convenient Place for Storing Bar Stock and Spare Car Parts

is shown an outdoor set of racks which have proved convenient in Fort Worth. A number of wood posts are set into the ground in the shop yard immediately back of the blacksmith shop and covered with a corrugated iron roof on a rough frame. Wooden cross-members are bolted to each post and extend out on each side so as to provide storage space for a large amount of material. In addition to bar stock, these racks are used for spare pull rods, brake beams, hand brake staffs and other parts which usually present an awkward storage problem.

New Equipment Available

Portable Acetylene Generator

A SMALL generator to produce acetylene at low pressure for welding and cutting has recently been developed by the Oxweld Acetylene Company, New York, N. Y. This supplements a line of larger generators which are used to supply pipe lines in electric railway shops where much cutting and welding is done.

The new generator takes 35 lb. of carbide at one charge and can be transported readily from place to place, thus providing a portable supply of generated acetylene gas. Empty, the generator weighs 210 lb.

An entirely new principle of feed control is used which might be called a "heavier-than-water" float. A vertical partition, extending nearly to the bottom into a water seal, divides the generator shell. One side is gastight and contains the carbide hopper at the top. The upper part of the other side contains gas regulating and protective devices and an automatic carbide feed control. Generation of the first acetylene causes water to rise on this side of the partition high enough to all but submerge a pan full of water, hung to a control lever. This pan acts normally as a weight acting counter to a spring, but as the water rises about it, its apparent weight is diminished and the carbide hopper valve is closed by the action of the spring. As acetylene is drawn off, water rises in the gas compartment and correspondingly lowers under the float, relieving some of the buoyancy under the water pan, which, gathering weight with the receding water, depresses the spring and allows a small amount of carbide to drop into the generator and restore equilibrium.

Acetylene Generator Takes 35 Lb. of Carbide at One Charge

Because of its low center of gravity, the generator rights itself when tilted at an angle of 30 deg. It works perfectly at an inclination of upward of 10 deg. No adverse effects result if a generator is knocked over while in operation. Nearly all fittings are inclosed in the cylindrical shell and there is practically nothing projecting which may be injured by a fall on a concrete pavement.

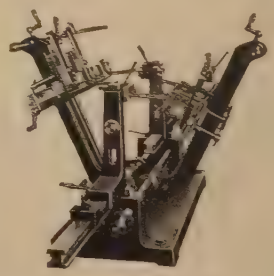
This generator has been submitted to the Underwriters' Laboratories, Inc., and has been listed by them as an acceptable device for installation.

Switchboard Instruments

TWO new lines of direct current panel-type instruments for switchboard mounting have been brought out by the Roller-Smith Company, New York, N. Y. These instruments include milli-ammeters, voltmeters, milli-voltmeters and volt-ammeters. Type TD instruments are 3½ in. in diameter and type F instruments 4½ in. in diameter. They employ the d'Arsonval mechanism, which the Roller-Smith Company has brought to a high degree of refinement.

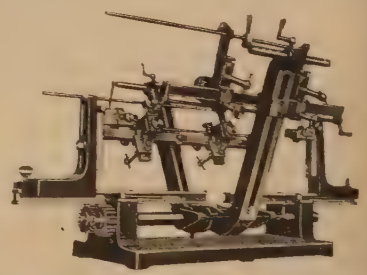
Improved Armature Coil Spreader

IMPROVEMENTS have been made in the Segur armature coil spreader and the new machine is now being placed on the market by the Electric Service Supplies Company, Philadelphia, Pa. An improved design for the coil blocks and end supporting knuckles enables the machine accurately to duplicate the angular relation of the slot portion of the coils. The parts are lever operated, which does away with loose parts, such as bolts, pins, toggles, etc. The supporting knuckles have adjustable side plates made of fiber. These can be renewed when necessary. The coil blocks are adjustable for both height and width of coils and are made entirely of steel, case hardened at wearing points. One movement of a single arm controls both coil blocks, either front or back, thus reducing the number of operations.



Spreader with Coil in Position after Being Spread

The holding plate of the coil blocks is within the operator's control at all times and is arranged so that loops can be spread before varnishing where this is desired. Authorities, however, have recommended that loops be varnished and baked before spreading, as this process toughens the cotton or silk insulation. The coil-forming device is adaptable for practically any standard type of coil, and the improvements reduce the number of hand operations.



Improved Coil Spreader in Open Position

The News of the Industry

Nine Cents Cash in Cincinnati

nitial Fare Fixed for New Franchise Under Which Cincinnati Street Railway Will Operate

Six tickets for 50 cents, or a 9-cent ash fare, has been agreed upon by epresentatives of the Cincinnati Street Railway and the Council committee on treet railroads as the initial fare to be rovided for in the new traction fran- hise. While the new proposal with its mendments will likely be passed by Council on July 1, its provision will not ecome effective until Oct. 1.

The conferees also have agreed that pproximately $300,000 will be set side each year from the earnings of he company for the redemption of $3,- 00,000 reducible capital, so that at the nd of ten years the permanent capital f the operating company will not xceed $25,000,000, the amount set by he Mayor's Citizens Traction Commit- ee. A tentative draft of the provision elating to the amortization of the $3,- 00,000 reducible capital has been pre- ented to the city administration. The rovision in substance sets forth that henever the fare control fund exceeds 400,000 the excess, unless otherwise rdered by the Director of Street Rail- oads, shall be placed in a separate und to be controlled by two trustees, ne to be selected by the director and ne other by the operating company. he trustees are to purchase capital tock of the company in the open mar- et in an amount not to exceed $300,000 n any one year. The stock so pur- ased is to be canceled.

Traffic Falling Off

It has been announced that the 7½- ent fare agreed upon in the franchise ejected by the Mayor's committee can- ot be accepted as the initial rate of are at this time. That fare was pred- ated upon the assumption that the ranchise would be in operation on Jan. of this year and that because of the educed fare the number of riders for he year would probably run to a total excess of 103,000,000 revenue pas- engers.

Failure of the committee at the last oment to agree to the terms of the roposed franchise continued the Cin- nnati Traction Company as the oper- ting company and also a 10-cent rate f fare. As a result there has been a ceady decrease in the number of rev- nue passengers. If the same ratio of ecrease is continued the aggregate umber for the year will not exceed 5,000,000.

The amortization for the reduction of he capital is a modification of a sug- estion made by A. E. Anderson of the itizens' committee and former City olicitor Saul Zielonka. That the Cin- nnati, Lawrenceburg & Aurora Elec- tric Street Railroad may be brought into the heart of Cincinnati over the tracks of the Cincinnati Street Rail- way has been announced as a possibility by Samuel Assur, representing the railway. However, Mr. Assur said that this matter depended upon the proposed franchise being ratified by the City Council and that the street railway again assumes operation of the service system.

Stockholder Acts to Protect Nashville Property

M. S. Adams, Mobile, a stockholder of the Nashville Railway & Light Company, has brought suit to have declared unconstitutional and void the law enacted in 1925 by the Legislature abolishing the operation of one-man cars in the cities of Tennessee with more than 30,000 population. The complainant alleges that compliance with the act would severely affect his interests in the defendant corporation and his property rights as a stockholder. He filed the bill as a matter of self-protection. If the Nashville company obeys this act, the complainant asserts, it must retire from service ten cars at a loss of approximately $60,000, remodel 36 other cars at a cost of $15,000 and purchase eight new cars at a cost of $88,000. The answer of the company was filed at the same time as the complainant's bill. It admits the truth of his allegations, another of which is that the classification of cities sought to be fixed is "arbitrary and capricious."

Detroit Dismissals Reviewed

Messrs. Schram, Merritt and Wilcox Out of Municipal Railway—Mayor and Schram Issue Contradictory Statements

ACTING on instructions from Mayor John W. Smith, the Street Railway Commission at Detroit dismissed Ross Schram, general manager of the Department of Street Railways, and also removed I. N. Merritt as auditor. Col. H. U. Wallace has been made general manager, but the position of auditor has not yet been filled. Announcement of these changes was made on June 5. The same day C. E. Wilcox resigned as claims attorney.

According to a statement given out by Mayor Smith following the commission's action the resignation of Mr. Schram was asked because of "inexperience and inefficiency" and because Mr. Schram did not have the true picture of the transportation situation in Detroit. The earnings of the D. S. R., according to the Mayor's statement, have been steadily decreasing. This was attributed by Mr. Schram to the fact that industrial conditions have been bad. The Mayor denied this was true and cited that the earnings of the jitneys and of the Detroit Motorbus Company have been steadily increasing, while the revenue from car riders has been falling off.

The city's chief executive stated that he is responsible to the people for the operations of the street railways, but that he knew no more about the inner workings than the most disinterested citizen, because Mr. Schram and Mr. Merritt had constantly shown themselves unable to work with him and with the Common Council and because they had neglected to furnish him with reports which he had repeatedly requested.

Mayor Smith further cited that only recently Mr. Schram employed a firm to audit the D. S. R. books without consulting the chief executive, and that courtesy due the office of Mayor had not been extended by Mr. Schram or Mr. Merritt. He further charged that both had shown lack of ability to get along with the men working under them and with the City Council.

In commenting upon the action which they took at the Mayor's request, one of the street railway commissioners stated that he believed Mr. Schram was doing a good job as manager of the D. S. R. The reports of the department showed it to be on a sound financial basis. Commissioners Barlum and Esselstyn comprised the majority that removed Schram and appointed Colonel Wallace. The third member of the commission, E. Ogden Ellis, is in Europe. Mr. Esselstyn was appointed to the commission by former Mayor James Couzens and Mr. Barlum was named by Frank E. Doremus when he was Mayor.

Mr. Schram's removal from the position as general manager has been considered inevitable ever since last November, when Mayor Smith was elected. The Mayor kept in mind the desirability of persuading the existing commission if possible that Mr. Schram's removal would be for the good of the service, without making any change in the personnel of the commission.

Upon being requested to resign Mr. Schram asked that an audit be made of the D. S. R. accounts. This proposal was agreed to by the commissioners. He will aid the new general manager in taking hold of affairs.

Mayor Smith's statement of June 5 follows:

> The resignation of Mr. Schram was asked because of inexperience and inefficiency, and because Mr. Schram did not have the true picture of the transportation situation in Detroit.

The earnings of the D. S. R. have been steadily decreasing and Mr. Schram has attributed this to the fact that industrial conditions have been bad. This is not true. The earnings of the jitney buses and the Detroit Motorbus Company have been steadily increasing, while the revenue from car riders has been falling off.

I am the chief executive of the city and the one who is responsible to the people for the operations of this railway line, and I know no more about its inner workings than the most disinterested citizen. This is because Mr. Schram and Mr. Merritt have constantly shown themselves unable to work with me and with the Common Council, and because they have neglected to furnish me with reports which I have repeatedly requested.

In reply Mr. Schram said:

As a matter of fact, I frequently went to the Mayor's office to consult with him, to ascertain his wishes, and to offer to give him any information he desired. To this the Mayor has invariably replied, with a grin: "The commission is running the street railway. I know nothing about it."

When I sought to lay a serious problem before him, so that he could intelligently co-operate in its solution, the Mayor would continue his grin and his silence, reserving any comments he may have had for the political supporters who were continually urging him to get rid of me, as he had promised them he would do. He was so busy looking for a successor to me that I could not get him to concentrate on important matters having to do with the street railway, and it appeared futile to try to get such concentration from him. About all the contact the department was able to have with the Mayor was through his secretary.

The Mayor refused time after time to approve of the minutes of the meetings of the Street Railway Commission, and I received a letter from him saying he was not going to approve them. He deliberately shut himself out from any information he needed to know about what the D. S. R. was doing.

The *Free Press* said in part:

Ross Schram was given a place under the Street Railway Commission not in the least because he was considered specially qualified by experience or ability for the executive jobs he successively held. If Mr. Schram now has lost his place partly as a result of a turn of the political wheel he has no legitimate grounds for complaint. There is no record of brilliant achievement which indicates his elimination from the scheme of municipal operation is going to be a loss to the city if an ordinarily competent man has been chosen as his successor. The new general manager can make himself *persona grata* with the general public by seeing that something better than cattle car accommodations are henceforth provided in exchange for the fares collected.

The *News* said in part:

Inexperience and inefficiency are broad charges. The first could be applied to the Mayor himself, who never held a city office before his election. If he considers inexperience in itself a valid ground for ousting a public servant, Mayor Smith should resign, for his experience is less than Mr. Schram's by several years.

Financially the city's railways are in an enviable position, and they are giving excellent service at a rate of fare considerably lower than that charged in most other cities, while the employees draw the highest pay in the country.

The reason for Mr. Schram's dismissal is not "inexperience" or "inefficiency." It is politics, and Mayor Smith would have been honest if he had said so. It is the only reason by which he can defend his action. And that reason is indefensible.

Conference on Bus Seniority

At a recent conference between John K. Punderford, president of the Connecticut Company, New Haven, Conn., and the members of the trolleymen's wage conference board negotiations were started for the settlement of the wage controversy and establishment of an understanding relative to the operation of buses. The men have explained that they want the company to recognize the seniority rule in the selection of drivers for the buses. Employees charge that the company has been engaging bus drivers who have never before been in the trolley service. Under the seniority rule employed by the company the men who have served the longest terms are given preference in the selection of lines over which they operate. Mr. Punderford declined to comment upon his view of the seniority rule as applied to the buses.

Wage Scale Renewed at Chicago

The Chicago Surface Lines and its employees have entered into a new contract continuing the wage scale of 75 cents an hour. The negotiations were carried through to a settlement harmoniously after the union, through William Quinlan, president of Local 241, had asked for 80 cents and many changes in working conditions. The company offered 70 cents.

The new contract continues an arrangement made by an arbitrator three years ago which brought the wage up to the present figure on a sliding scale. The arbitration ended a three-day strike.

The Surface Lines submitted that prices are lower now than they were three years ago, when the men walked out, and that to grant the figure of 80 cents would be impossible because it would mean an increase over the present fare of 7 cents.

The company agreed to arrange night runs, as far as possible, to end at 7 o'clock in the morning or earlier.

The settlement virtually fixed the scale for the Chicago Rapid Transit Company, operating the elevated lines.

Board Ends Grand Rapids Controversy

The board of arbitration which has been hearing evidence in a controversy between the Grand Rapids Railway, Grand Rapids, Mich., and the local division of the Amalgamated over six cases of dismissal has rendered its decision. Four probationers and two old employees had been dismissed from the service and the union protested, charging discrimination and seeking their reinstatement. The company based its action on its responsibility to patrons and assurance of safety to the public.

In dealing with the probationers' case, the arbiters' decision was that conductors, motormen and operators who are serving the 90-day probationary period are not entitled to full protection of the contract between the company and the union employees. The decision advises the agreements with the company by both the union and the employees' association be amended to forbid soliciting probationers for membership to avoid irritating rivalry.

In the case of a man with 29 years' service, the arbitrators substituted for discharge a suspension of 30 days without pay for colliding his car with a city tractor, and in the case of a platform man of two years' service, dismissed for calling a fellow employee "a scab," the board reinstated him, but imposed in place of discharge suspension for fourteen days without pay.

The board of arbitration said that the maintenance of adequate and careful service was essential.

Union Willing to Arbitrate in Davenport

The suggestion that arbitration be entered into between the men and the Tri-City Railway, Davenport, Iowa, made by representatives of the union in conference with R. J. Smith, general manager, has been adopted.

The union has addressed a communication to Mr. Smith announcing its willingness to accept the working agreement offered by the company on May 28, provided that it carries a clause covering the scale of wages now in effect. The union has submitted a tentative arbitration agreement to the company providing that the board shall agree upon the wages to be paid the men, including trainmen and shopmen, and that any awards shall be retroactive to June 1. The agreement also provides that the board shall be selected in the same manner as the one which was in effect June 1, 1922, to May 31, 1923.

In Illinois a slight increase will be asked, possibly to 60 cents an hour. The present rate is 58½ cents.

Two Arbitrators Chosen for Boston Arbitration

Fred A. Cummings, vice-president of the Eastern Massachusetts Street Railway, Boston, Mass., has been appointed arbitrator for the company in the negotiations looking toward a new wage agreement. James H. Vahey has been selected by the carmen's union to act as arbitrator for the employees. The third man has not been agreed upon.

The wage scale of employees of the Eastern Massachusetts Street Railway expired on May 1, 1925. The present scale, in cents per hour, is:

First three months	52.5
Next nine months	55.5
Thereafter	58.5

One-man car operators, 5c. an hour extra

These rates became effective May 2, 1923, and were to have expired May 1, 1924. On July 2, 1924, however, they were renewed for another year.

The men are asking for an increase in the basic rate from the present level of 58 cents to a new one of 70 cents. The present level was incorrectly given in ELECTRIC RAILWAY JOURNAL, issue of May 30, page 864. The men are asking that the differential in favor of the operators of one-man cars be increased from the present rate of 5 cents to a new rate of 8 cents, so that if the request were granted about 95 per cent of the carmen in the employ of the Eastern Massachusetts would be drawing 78 cents an hour. All demands are merely bases for negotiations and it has not been agreed yet what to submit to arbitration.

Pittsburgh Sells 31,000 Weekly Passes

Reports for the first week of Pittsburgh's $1.50 weekly pass, started Monday, June 1, show a sale of more than 31,000. The sale of the 25-cent Sunday passes good for the same area exceeded 29,000 despite the fact that the weekly pass includes Sunday.

Paving Restrictions Modified in Charleston

Onerous paving requirements have been removed at Charleston, S. C., by the adoption by the City Council of a resolution from the ways and means and streets committees and the board of public service granting a petition of the Charleston Consolidated Railway & Lighting Company asking that it be relieved of street paving and maintenance costs, except as damage be done to the paving by the operation of the cars. Originally the company was required to pay for paving between its tracks and 3 ft. on each side, but by an amendment in 1922 the bearing by the company of the cost of such work was reduced to one-half. The resolution adopted follows:

Whereas the Charleston Consolidated Railway & Lighting Company, successor to the Charleston City Railway, has petitioned City Council that:

1. The company be relieved of further charges for new paving or replacement of existing paving.

2. The company be relieved of the cost of maintaining paving along its tracks, except insomuch as such paving is destroyed or damaged by the operation of its cars or the maintenance of its tracks, and

Whereas conditions of travel and paving have materially changed since the granting of the franchise in 1897, and

Whereas City Council is desirous of relieving the railway of any unfair or undue hardship: therefore be it

Resolved, That section 11 of the franchise of the Charleston City Railway, dated March, 1897, as amended on Oct. 10, 1922, be further amended so the same shall read as follows:

Section 11. The Charleston City Railway shall at all times keep the space between the tracks and for 3 ft. outside in good repair, so as to conform to the condition of the balance of the streets upon which the road runs, except in such cases where, in the opinion of the company, damage or expense is not caused by the company, its cars or its tracks, then such expense be referred to the city engineer for his decision as to whether due by the company or not, but the decision of the engineer shall be reviewed by the Board of Public Service, and its finding and decision shall be final and binding on the company. In case any streets now unpaved or paved shall be paved or repaved, the said company shall bear and pay the city all added or additional expense which shall be incurred in paving such streets by reason of and due to the presence of the tracks of the company upon such streets, and generally, except where otherwise provided for in this grant, shall observe and obey the regulations, enactments and provisions contained in the General Ordinances of the City of Charleston, with reference to street railroads and the ordinances to be hereafter ordained amending the same.

City Holds Up Chicago Elevated Improvement

Plans prepared by the Chicago Rapid Transit Company for the extension of station platforms to permit the operation of longer trains are being delayed in their execution because the city has not yet granted permits for the extension of platforms on the loop. Unless authority is granted to extend the loop platforms, the west side lines would not get the benefit of longer train operation, as the platforms on the inner loop tracks are not of sufficient length to accommodate longer trains. The city administration has said that the permits on the loop will not be issued unless the company consents at its own expense to remove its columns from the street and place them on the curb line. In that connection it is pointed out by the company that the original plans of the engineers provided for columns placed at the curb lines. The property owners refused to give frontage consent under those circumstances and in that they were supported by the then city administration and Council. The city ordered the company to place the supporting columns in the street and it had to comply if the loop was to be built. At that time there were few if any sub-basements under the sidewalks and the placing of the supports on the curb line would have been a comparatively simple problem. Today there are many basements under the sidewalks and this would make the relocation of the columns a difficult and expensive engineering problem.

Georgia Interurban Seeks Higher Fare—Opposition Intense

Suspension of service on the Atlanta Northern Railway, an interurban line running between Atlanta and Marietta, Ga., looms ahead for the second time as a result of opposition to a proposed increase in passenger rates asked of the Public Service Commission. The first public hearing on the increase in fare was held before the commission on June 4. It resulted in a heated argument between Preston S. Arkwright, president of the Georgia Railway & Power Company, which owns the road, and Judge Newt Morris, Marietta, who opposed any increase in the present rates.

In the opening statement before the commission Mr. Arkwright stated that during 1924 the Atlanta Northern fell more than $80,000 short of making an 8 per cent return on its actual investment and asked an increase of 1 cent for each zone—an increase from 6 to 7 cents—making a total increase of 7 cents between Atlanta and Marietta. He stated that the increase had been approved by a committee representing the Marietta City Council and the Chamber of Commerce, and that the increase in cost of commutation ticket books was only $1.50—from $8.50 to $10.

Judge Morris charged that the Georgia Railway & Power Company collected numerous charges from the Atlanta Northern Railway, including $38,000 for power, $45,000 for the rent of tracks and facilities, $8,000 for carhouse employees and $6,000 for station employees, in addition to taking 5 cents out of each fare for the transportation of passengers over the streets of Atlanta. He said these charges caused the books of the Atlanta Northern to show a loss for the year rather than a profit.

Following statements by Judge Morris that the Georgia Railway & Power Company had "terrorized" the people of Marietta into eliminating jitneys by suspending operations, Mr. Arkwright refused to answer any more questions on the part of Judge Morris, and Chairman Trammel of the commission abruptly closed the hearing.

Should the decision be adverse, the Atlanta Northern may suspend operations a second time, as railway officials have plainly indicated that they will not continue to operate the line at a loss. Should the increase be granted, it will be applied in the hope that operation at a profit may be achieved.

South Jacksonville Celebrating Successful Operation

South Jacksonville, Fla., is rejoicing again. The occasion this time is the anniversary of the opening of the railway a year ago. The record of the year shows that 800,000 passengers were carried and that approximately 10 per cent profit was made on the original investment. The city officials of South Jacksonville express their appreciation of the co-operation by officials of the Jacksonville Traction Company, which operates the road under contract. No damage case of importance was reported during the year.

The opening of an electric railway line owned by the city and operated by the Jacksonville Traction Company was celebrated by South Jacksonville on May 15, 1924. The service was the culmination of a two-year effort on the part of the people to secure railway service. At that time $100,000 in municipal bonds was voted by the citizens of South Jacksonville as the amount necessary to build the line to the corner of Hendricks Avenue and Pine Street.

The construction contract was let to Stone & Webster. City Engineer J. L. Crary acted as supervisor. By careful use of the funds the construction was accomplished for $73,000. This included an additional 1,156 ft. of track, bringing the car line to the corner of Atlantic Boulevard and Hendricks Avenue.

Since the installation of the service the tracks have been extended and are soon to be carried to the corner of Kings Road and Atlantic Boulevard. There is a car every fifteen minutes. The fact that only four cars are available has prevented the shortening of the schedule.

Paving Controversy in Ohio City

Bankruptcy for the Springfield Street Railway with consequent municipal operation is certain if the paving program contemplated by the city of Springfield, Ohio, for this summer is carried out. Paul C. Martin, president of the railway, in a statement issued June 10, declares that the proposed street improvements will involve expenditures of $100,000 by the company at a time when every monthly report of operations records a loss.

Robert W. Flack, city manager, declared that some satisfactory solution of the matter would be reached. Under the terms of its franchise the company is guaranteed a return of 6 per cent on the total value of its property, failing which, the lines may be taken over by the city if the company so elects. Mr. Martin declares the company does not wish to give up the property unless forced to it by additional financial burdens.

Contractors assert that a possible compromise will be reached by permitting the railway to retain old bases, ties, tracks, etc., and simply resurface its section of streets to be paved.

Some months back the company elected, under the terms of its franchise and provisions in its contract with the platform men, to establish one-man car service on most of the lines. Eighty per cent of the cars are being operated with one-man crews except during rush hours.

Recent Bus Developments

Boston & Maine Plans White Mountain Service—New York State Railways Starts Resort Service

THE Boston & Maine Transportation Company, the subsidiary to handle the bus line business of the Boston & Maine Railroad, announces plans for operations between Boston and the White Mountains and between Boston and Portland, Me., possibly to go into operation by July 1.

The motor coach routes projected in New Hampshire are intended to provide service in new territory or to extend or supplement service now given by passenger trains of the Boston & Maine Railroad. It is reiterated that there is no intention to operate buses on lines paralleling the railroad in commuter zones. The lines for which approval of the New Hampshire commission is asked are: Plymouth to Lincoln, Franklin and Franklin Falls to Bridgewater, Concord to Dover and Concord to Sunapee and Newport, N. H.

The Boston & Maine Transportation Company is to operate motor coaches on the Boston-Portland run and in a service to the White Mountains, it is announced, "in an effort to determine for itself and for the public the extent to which such services may offer attractions not presented by the railroad, and the extent to which such services may be developed along sound, economic lines."

The coach service which the Boston & Maine Transportation Company is to substitute for the passenger trains on the York Harbor & Beach Railroad is expected to start on June 22 between Portsmouth and York Beach, with stops at the important seacoast towns and villages along the route. Within a week or two of that time it is expected that this service will be extended further between Ogunquit and Wells, as previously announced.

The Wisconsin Power & Light Company will operate one of its coaches, now in interurban service, on a daily trip, starting at 2 p.m., around and about Madison, Wis. This will be a sightseeing trip covering about 25 miles. Attractive circulars have been issued by the company describing the local tour plan.

The New York State Railways has opened bus service on three lines connecting Rochester and three lakeside summer resorts. The routes are to Island Cottage from the Dewey Avenue bus terminal for a 35-cent fare; from the city to Manitou Beach, via the Ridge Road and passing through Greece and Hilton, for one-way fare of 70 cents, and from the end of the Dewey Avenue feeder bus line to Grand View Beach for a one-way fare of 45 cents. Regular schedules are maintained from 7 in the morning to 10 in the evening, with additional service on Sundays and holidays. The bus system along the Lake Ontario shore is operated by the railways' subsidiary, the Rochester Railways Co-ordinated Bus Lines Inc.

With the purchase of the Ridge Road line from Buckley Brothers for $15,000, the last obstacle in the path of the bus system project was removed. The Ridge Road line was a bone of contention for months, as the Hilton Town Board refused to grant the railway a franchise in competition with the Buckleys and consequently held up the project until the purchase on May 26.

Pending the arrival of six Bender bodies from Cleveland, the company is using rolling stock it had on hand and the four White buses it acquired with the purchase of the Ridge Road line from Buckley Brothers. The service extends over 36 miles in all and in the main supplants the service given by the abandoned Rochester & Manitou Electric Railway. Transfers are issued to city trolley lines.

The Nueces Railway, Corpus Christi, Tex., recently received two Reo buses to be operated in supplementary service.

The Illinois Commerce Commission has authorized the East St. Louis & Suburban Railway to replace its Oakland Street car line in Belleville, Ill., with buses. The company has been using buses on the Oakland line for about a year. The bus service has proved so satisfactory to all concerned that it has been decided to go through with an agreement reached a year ago to dismantle the car line.

The Mid-State Coach Lines, the bus company operated by four Central New York trolley corporations, has opened service in Auburn to supplant the abandoned Seymour Street trolley line section and serving an area in West Auburn hitherto not directly reached by trolley lines. This line is one of several to be installed by the company to cover other sections of Auburn.

The Knoxville Power & Light Company, Knoxville, Tenn., is considering the use of buses to suburban districts.

Permission to establish a coach line to serve the south side in the Grant Park section of Atlanta, Ga., has just been granted the Georgia Railway & Power Company by the Atlanta City Council. The service will be similar to that established some months ago in the Morningside and Sylvan Hills sections not reached by street cars. Under the terms of the permit, a 10-cent fare will be charged for rides on coaches or combination rides on coaches and street cars. Transfers will be issued from bus to car and from car to bus, but in the latter instance must be accompanied by 3 cents, bringing the total up to 10 cents. The interchangeable fare arrangement is, however, only temporary and will in no way affect routes to be established later and which will extend to the center of the city.

The Board of Public Utility Commissioners has authorized the Ocean City Electric Railway to discontinue service on its crosstown line, Ocean City, N. J., and to substitute bus service thereon. Evidence indicated that the railway was financially unable to restore its track to proper operating condition.

The Durham Public Service Company, Durham, N. C., through R. L. Lindsey, vice-president, has laid before the City Council a proposal to motorize the entire Lakewood Park-Mangum Street line, one of the two main lines of the Durham system, serving all the northern and all the southwestern sections of the city. The Council has referred the matter to the utilities committee. Bus lines are already in operation in West Durham and over much of north central Durham and the Club Boulevard section. They are also being operated on the Chapel Hill Street section during the construction of the Chapel Hill Street underpass, which blocks railway traffic to that end of town.

The Syracuse Railway Co-ordinated Bus Lines, Inc., has applied to the Common Council of Syracuse, N. Y., for a bus permit to operate from Syracuse to Chittenango.

The Alexandria & Suburban Motor Vehicle Company, subsidiary of the Washington-Virginia Railway, Washington, D. C., has received provisional permission to operate buses in the District of Columbia over a specified route leading to Alexandria, Va. Interstate business only is allowed. The grant is not effective unless the Corporation Commission of Virginia issues a certificate for operation in that state.

The Union Traction Company of Indiana expects to ask for the abandonment of one city line in Marion, Ind., in favor of bus service. Officials contend the line does not pay and the company's finances are not in condition to permit it to make repairs.

The St. Louis Bus Company, controlled by the reorganization committee of the United Railways, St. Louis, Mo., has requested the St. Louis Board of Public Service to authorize a new bus line that will form a loop with five street car lines in the southwestern section of St. Louis. The permit, if granted, would enable the St. Louis Bus Company to operate in a territory that is now served exclusively by the People's Motorbus Company. Part of the route sought is over streets now used by the rival bus company. Transfer privileges will be granted between the cars and the new bus line. The People's Motorbus Company is expected to oppose this line vigorously.

Officials of the Waterloo, Cedar Falls & Northern Railway have noted that since the Rainbow Drive has been paved there has been an increase in the popularity of the buses between Waterloo and Cedar Falls, Iowa. So much are the buses favored that the railway plans to discontinue the half-hour service between the cities of Waterloo and Cedar Falls and operate only once an hour. It is the intention of the company to serve patrons between the two cities exclusively with buses after 7:15 p.m.

A petition of the Rockford & Interurban Railway for permission to operate interurban buses into Rockford, Ill., on North Second Street was presented recently to the City Council.

Freight Delivery Planned in Eastern Massachusetts

The Boston & Worcester Street Railway is planning an extensive door freight delivery to cover practically every city and town in eastern Massachusetts. In Lowell, Lawrence, Andover, Haverhill and Boston the system was tried during 1924 and was reported favorably. It is planned to make door-to-door delivery along the entire system. Shipments west of Boston will be delivered to the exact address within 24 hours of their receipt at the forwarding station.

Election at Decatur Next Step

W. A. Baehr, president of the Illinois Power & Light Corporation, has approved the final draft of the railway franchise for Decatur, Ill. Nothing now remains but to pass the ordinance and call the necessary election for the approval of the voters. More than a month ago the Illinois Power & Light Corporation and the city reached an agreement on the terms. When the final agreement was reached several changes were incorporated in the final draft and were submitted to the Illinois Power & Light Corporation for final approval. The most important addition to the franchise, patterned after the old franchise which expired in 1921, is the section giving recognition to the bus. It provides that the company, with the sanction of the City Council, may substitute buses for street cars on any existing line for a period of six months, subject, at the conclusion of that time, to a vote of the people. The franchise is for twenty years.

Ten Cents in Plattsburgh

An order was issued by the Public Service Commission on June 5 authorizing the Plattsburgh Traction Company to increase its fare from 7 cents to 10 cents on one day's notice. Three tokens will be sold for 25 cents good within the city limits. It was shown at the hearing that the road had long been operated at a loss by the Delaware & Hudson Company and that it was bought in April by two Plattsburgh bankers to save it from being abandoned. It is estimated that the 10-cent fare will provide sufficient revenue approximately to meet expenses without paying any return on the investment.

St. Louis Promulgates Downtown Parking Rules

Downtown parking is prohibited in St. Louis, Mo., effective June 23, between 7 a.m. and 10 a.m. and 4 p.m. and 6 p.m. by an order issued by the Traffic Council on June 4. The ruling holds for 90 days, after which it must be adopted as an ordinance by the Board of Aldermen. All but commercial vehicles are affected, the limit for these being fifteen minutes. The Council also stipulated designated parking spaces for intercity bus lines. No other vehicles will be permitted in such spaces. The intercity buses will not be permitted to discharge or take on passengers in St. Louis except at the spaces named and at certain points.

News Notes

Ten-Cent Fares Continued. — An order was issued by the New York Public Service Commission on May 29 permitting the Westchester Street Railroad to continue in effect the present 10-cent fare schedule in each of the six zones until Dec. 1, 1925. The communities through which the company operates have consented to the continuation. The order affects the Tarrytown, Silver Lake, Scarsdale and Mamaroneck Avenue lines.

Third Arbiter Chosen.—Thomas J. Williams, a conciliator for the federal Department of Labor, was recently designated by Secretary of Labor Davis the third member of a wage arbitration board that will settle the differences between the Scranton Railway, Scranton, Pa., and its employees. Secretary Davis was asked to name the umpire on the wage arbitration board when representatives of the company and the union failed to come to an agreeable selection of a third man. The two other arbiters who will take part in this issue are John M. McCourt for the company and L. F. Hart for the men. At a special meeting of the union workers held a week ago the employees voted to prolong arbitration and continue at work. The union workers originally asked for a general increase of 16 cents an hour for all employees. If granted the 16-cent boost it would bring the hourly rate of motormen and conductors up to 80 cents. The wage contract expired on April 1.

Conference Considers Charges.—At the conclusion of a conference between city officials and officers of the Louisville Railway, Louisville, Ky., it was declared by the president of the Council that Louisville would continue to operate on a 6-cent fare. This apparently is the result of the conference called to discuss with officials the contents of a resolution passed by the General Council censuring railway officials for alleged extravagances in the management of the company. Everything contained in the report of the Utilities Bureau to the Board of Works was gone over at the conference. Others at the meeting would make no statement other than that nothing had been accomplished.

Passes for All Time.—The weekly pass has been adopted for use indefinitely by the Utah Light & Traction Company of Salt Lake City, Utah, after a trial period of several months.

Power Dispute Terminated.—The city of Toledo lost its final battle to collect alleged overcharges by the Toledo Edison Company for current used by the Community Traction Company in operation of railway lines in Toledo when the Supreme Court of Ohio, on June 3, sustained motions for the two companies to dismiss the appeal on error taken by the city attorneys. City officials, when W. E. Cann was street railway commissioner, claimed that the Toledo Edison Company had collected $300,000 too much in power charges. The question of the future rate is now before the Public Utilities Commission. Voluntary reductions in the power rate were made several months ago by the company so that the dispute is practically a closed incident. Action of the Supreme Court closed the courts as a means of determining power rates under the Milner service-at-cost ordinance.

New Routing in Pawtucket. — Pawtucket, R. I., recently installed a loop system whereby practically all cross-town lines have been eliminated by the United Electric Railways. With the start of the new routing the system of fare payment has been changed so that no fares are collected in the center of the city, inbound fares being taken as the passengers enter and outbound passengers paying as they leave the cars. This is expected to speed up car movement in the center of the city.

Contract Submitted. — Mayor Kendrick of Philadelphia, Pa., recently submitted to the Council with a message an ordinance authorizing the execution of a contract, the parties being the Philadelphia Rapid Transit Company, Philadelphia City Passenger Railway, West Philadelphia Passenger Railway, the Philadelphia Traction Company and the Union Traction Company. The new contract is supplemental to an agreement entered into on Feb. 2, 1925, between the city and the Philadelphia Rapid Transit Company for the leasing by the city to the Philadelphia Rapid Transit of a two-track surface car subway in Chestnut Street proposed to be constructed by the city.

Jitneys Must Cease.—By an act of the City Council of Savannah, Ga., the jitneys will pass out as a means of public transportation in that city on Oct. 1. The Savannah Electric & Power Company, which runs the railway in Savannah, said it would have to reduce service in Savannah and into the suburbs unless it was protected from unfair competition. Jitneys began running in Savannah six or seven years ago.

One Fare Zone Eliminated. — The Public Utilities Commission has granted the application of the Newport Electric Corporation, Newport, R. I., to create a neutral zone in Tiverton by which one fare zone will be eliminated between Tiverton and Fall River and the operation of trolleys, buses or both between Tiverton and Newport was approved. Some months ago the company was granted permission to substitute buses for trolleys between Newport and Tiverton during the period from Sept. 1 to June 1, continuing the electric railway from the Stone Bridge to Fall River. Now the company can run either trolley or buses as the traffic warrants.

Date for Trial Fixed.—The United States District Attorney at Buffalo has tentatively fixed June 22 as the date for the first of the series of trials of executives and members of the Amalgamated Association under indictment on charges of conspiracy in connection with the dynamite outrages on the Buffalo-Niagara Falls high-speed interurban line at Elwood during the strike of 1922. All of those indicted in the last report of the federal grand jury have been taken into custody.

Financial and Corporate

Purchase Details Stated

Basis of Acquisition of Virginia Railway & Power Company by Stone & Webster Made Public

Frank J. Gould, until recently owner of the controlling interest in the Virginia Railway & Power Company, Richmond, Va., sold his holdings at a flat price of $100 a share for the preferred stock and $120 a share for the common. The agreement made at the time of the sale of the majority shares gave Richmond stockholders the privilege of disposing of their stock at the same price. A number of stockholders are said to have taken advantage of the offer, with the Virginia Trust Company, Richmond, as clearing agent. All stockholders who desire to sell have been asked to present their stock, signed and stamped ready for transfer.

The total stock held by Richmonders is said to be approximately $750,000 in common and $2,000,000 preferred. The outstanding capital stock of the company is $9,000,000 preferred and $12,000,000 common. Mr. Gould had owned the controlling interest since the organization of the present company in 1909.

The controlling interest was purchased by a syndicate composed of Stone & Webster, Inc., Chase Securities Corporation, Blair & Company, Inc., and Blodget & Company. The sale was brought to a successful close recently after Charles A. Stone had returned from Paris, where preliminary steps were arranged with Mr. Gould for the purchase of his interest. Several other Virginia properties have also been taken over by the syndicate.

The properties are located in a prosperous section of the Roanoke and Rapidan Valleys, where the company furnishes electric light, power and railway service to Richmond, Norfolk, Petersburg, Portsmouth and other communities, and does the entire gas business in Norfolk. There are five generating stations, including both steam and hydro-electric, with a capacity of 140,000 hp., and the company owns valuable undeveloped water-power sites on the Rapidan and Roanoke Rivers. The purchase also includes the Spotsylvania Power Company, which serves Fredericksburg and owns several valuable power sites on the Rappahannock River. The properties will be under the executive management of Stone & Webster, Inc.

Mr. Stone, in a statement made on June 8, said:

> It has been felt for some time that Mr. Gould might consider selling his interest in the Virginia public utilities, and we feel that we are very fortunate in successfully making the purchase. We are very glad to have the opportunity to assist in the development of this part of Virginia. The policy of the new owners will be to render first-class service, to co-operate fully with the customers, the general public and the authorities, and to provide extensions to the plants and other facilities as rapidly as is necessary to keep pace with the growth of the community served.

On June 10 the Virginia Railway & Power Company announced an issue of $2,660,000 first and refunding mortgage 5 per cent bonds, offered by Stone & Webster, Inc., Blodget & Company, and Blair & Company, Inc., together with $486,000 Virginia Railway & Power Company-Norfolk & Portsmouth Traction Company first mortagage 5 per cent bonds, both at 98½ and interest. These offerings are part of the issues now outstanding and do not represent new financing. Both issues are the direct obligation of the company.

Council's Offer for Rainier Line Submitted

A formal offer of $1,000,000 in utility bonds made by the City Council of Seattle, Wash., recently for the Seattle & Rainier Valley Railway has been transmitted to M. C. Sampsell, Chicago, president of the company. Walter M. Brown, resident manager at Seattle, states that should the city's offer be satisfactory the proposition will be submitted to the bondholders for ratification.

Following the action of the City Council in making the formal offer, opponents of the deal began to agitate a movement for a referendum. No definite steps will be taken, however, until the Council, by ordinance, shows it intends to complete the purchase.

The Rainier Valley line consists of about 25 miles of tracks and 32 cars. Originally, the company asked $1,500,000 for the system. The line is the only privately owned railway in the city, the major system having been purchased by the city in 1919 from the Stone & Webster interests of Boston for $15,000,000.

Baltimore Valuation Hearing Resumed June 16

Testimony in the hearing before the Maryland Public Service Commission to fix a valuation on the property of the United Railways & Electric Company, Baltimore, during last week was principally confined to the question of "going value." Witnesses for the railway, including heads of various departments, were called upon to substantiate the claim made by the company that the "going value" was $16,000,000.

Some testimony also was heard in regard to rerouting, but the commission held that the company would not be forced to make any extensive studies of this subject until after a fair valuation was determined. Joseph A. Stoll, superintendent of traffic, was one of the witnesses who testified as to rerouting. It is claimed by Clarence W. Miles, people's counsel, that rerouting would save considerable money.

Following the hearing held on June 5 the case was adjourned until June 16. At that time the United will present testimony in regard to the weekly pass. Mr. Miles petitioned the commission several days ago to order the company to show cause why it should not put this weekly ticket plan into operation.

Final Hearings Held

Minnesota Commission Expected Shortly to Announce Rates of Fare in Minneapolis and St. Paul

Rates of fare on the St. Paul City Railway and the Minneapolis Street Railway will be announced by the Minnesota Railroad and Warehouse Commission early in July. After a final hearing of one day the commission had the figures submitted by the railways to bring their valuations to date. Valuations already announced by the commission for the two properties were not of even or recent dates. The temporary rate of fare in both cities is 6 cents flat with universal transfer. Each company is asking a 7-cent fare. In case of disapproval by either the cities or the railways of the permanent rates made by the commission appeal is allowable to the district courts.

At the hearing the Minneapolis company held that its property had increased in value from Jan. 1, 1922, to Jan. 1, 1925, $1,832,867, bringing the total to $27,178,948. The city held the increase was only $306,554. The commission had fixed the valuation as of Jan. 1, 1922, at $25,346,081. The St. Paul company held its property had been increased in value $206,019 from the valuation of $15,998,849 as of Jan. 1, 1924, as fixed by the commission, or to a total of $16,204.868. The city put the increase at $167,650.

Permanent Fare Rate Agitated

For the first time since the rate hearings began two years ago the matter of permanent rate of fare was brought up at the hearing ended on June 2. D. J. Strouse, comptroller of the Twin City Rapid Transit Company, said that to earn 7.5 per cent on the valuation of $27,165,396, the expected rate of return to be announced by the commission, the company in Minneapolis will need a fare of 6.6 cents. To continue the improved service of 1925 the company will need 6.61 cents fare, and if it is to make improvements in 1925 of 4.86 per cent over the 1924 standard as required by the city ordinance of 1920 the fare must be 7.16 cents. The city maintained the company can show a profit at the present rate of fare.

In St. Paul a fare of 7.38 cents would be necessary to secure a return of 7½ per cent. Earnings in St. Paul have been decreasing. The city contends that if the amount claimed by the company for depreciation is reduced and cost of the valuation proceedings is spread over ten years the company will be able with a 7-cent fare to make extensions and lay pavements. The city wants the depreciation charge reduced from $350,000 to $150,000 and suggests the valuation expense of $300,000 be charged off at the rate of $30,000 a year.

The April report of the St. Paul City Railway shows a net loss of $15,987. For four months the operating income was $228,803, compared with $233,961 for the similar period in 1924. The passenger revenue declined from $421,594 in January to $353,292 in April, 1925. For the four months the company earned 4.2 per cent on the commission's valuation figure.

Surplus in Omaha

Decrease in Number of Passengers and Passenger Revenue—Higher Fare Allowed

Passenger revenue of the Omaha & Council Bluffs Street Railway, Omaha, Neb., for the year 1924 compared with 1923 shows a decrease of $193,544, or 4.80 per cent. The decrease in number of passengers was porportionately greater, but the increased fare in Council Bluffs and on the bridge line, put into effect on Aug. 3, partly offset the diminished travel. The company attributes this falling off in travel to the increased use of automobiles. It says this was shown conclusively during the severe weather in December, 1924, when traffic increased over December, 1923.

Revenue from other operations shows an increase of $35,770 for the year, but non-operating revenue shows a falling off of $13,547.

Operating expenses decreased $191,113, or 6.16 per cent. Of this amount $47,500 represents a reduction in the sum set aside for depreciation. Approximately $20,000 represents a saving in the price paid for coal and a lessened consumption of power, and the remainder is due to smaller amounts expended for maintenance of cars, track and roadway, etc., and to a reduction in the car-miles operated. For injuries and damages a somewhat smaller sum was also required than for 1923.

Expenditures for renewals and replacements were rather large during the year. Expenditures for actual additions to the property on the contrary were small, but charges for betterments representing improved construction of replacements were considerable.

Expenditures for renewals and replacements of the leased lines in Council Bluffs were $243,463. The major charge to this account was that part for the reconstruction of the Missouri River bridge, which was in the nature of replacement rather than addition.

After a hearing before the Nebraska State Railway Commission on the company's request for a reconsideration of certain elements of value in the commission's valuation finding, the commission increased the value of the company's property in Nebraska for ratemaking purposes from $13,800,000 to $14,100,000. This does not purport to be the full value of the company's property, but is merely the value for ratemaking purposes. Other assets would bring the total value to a considerably higher figure.

In August the company increased the local fare in Council Bluffs from 5 cents to 7 cents cash or four tickets for 25 cents, after obtaining a temporary order in the United States District Court restraining the city of Council Bluffs from interfering with the raise in fare. At the same time the rate for a 30-ride commutation ticket between the two cities was increased from $1.50 to $2. The city of Council Bluffs has taken an appeal to the United States Circuit Court of Appeals. If this court sustains the lower court, the District Court will proceed to take evidence through a special master as to the value of the railway property in Council Bluffs, the revenues received and the operating expenses and determine whether the new rates of fare yield more than a reasonable rate of return on the fair value of the property used in giving service. The opinion expressed in the report was that on the merits of the case the rates would be sustained.

The Nebraska State Railway Commission has since authorized the company to advance its fare on the Omaha lines.

INCOME ACCOUNT OF THE OMAHA & COUNCIL BLUFFS STREET RAILWAY FOR THE YEAR ENDED DEC. 31, 1924

Revenue from transportation:		
Passenger revenue	$3,836,694	
Special car revenue	1,435	
Mail revenue	185	
Miscellaneous transportation revenue	4,114	
Total revenue from transportation		$3,842,428
Revenue from other railway operations		499,045
Gross railway operating revenues		$4,341,473
Railway operating expenses		2,913,817
Net operating revenue		$1,427,656
Taxes assignable to railway operations		446,395
Operating income		$981,261
Non-operating income:		
Net income from miscellaneous physical property	$859	
Income from funded securities	4,696	
Income from unfunded securities and accounts	16,466	
Miscellaneous income	872	
Total non-operating income		22,893
Gross income		$1,004,154
Deductions from gross income:		
Rent for leased roads	$60,500	
Rent for leased roads, interest on funded debt	90,400	
Miscellaneous taxes	7,990	
Interest on funded debt	469,390	
Miscellaneous debits	5,641	
Total deductions from gross income		$633,921
Net income		$370,233
Dividend on preferred stock—5 per cent	$200,000	
Profit and loss adjustment—credit	125,748	74,252
Surplus for the year		$295,982
Surplus Jan. 1, 1924		306,277
Surplus Dec. 31, 1924		$602,259

Value of Capital Traction Increased

As the result of a decision by Justice Adolph A. Hoehling of the District Supreme Court the valuation of the Capital Traction Company, Washington, D. C., will be increased from $17,500,000 to more than $28,000,000. The decision was handed down on June 8.

John H. Hanna, vice-president and general manager of the Capital Traction Company, said that the carfare would not be affected. Further, that while increasing the value would tend to make the company's rate of return much lower at the present fare, the company has no plans for seeking a change.

The addition made by Justice Hoehling was $5,150,000. This sum was claimed as an addition to valuation by the company as representing the franchise, good will and other intangible values involved in the purchase of the old Washington-Georgetown Street Railway. The commission had refused to allow it as part of the calculated value of the Capital Traction Company's property. The decision directed the commission and the company to submit to Justice Hoehling their respective calculations of the value of the physical plant of the corporation, using current prices instead of the prices at which the materials and services were paid for in its construction.

While Justice Hoehling was making his decision on June 8, the commission decided that $23,067,000 was its calculation of the value of the physical property in the light of present-day prices. The company has decided, it was reported, to name as its view of this value $25,700,000. Choosing between these two estimates, the court cannot fix the physical value at less than $23,000,000, but since Justice Hoehling has already decided to include the intangible values, the new valuation cannot be less than $28,000,000 and may be $30,700,000 if the judge uses the company's estimate instead of that of the commission. It is said that the commission will appeal from the ruling of Justice Hoehling, although no decision had been made as yet to do so.

Rumored Sale of Annapolis Road

Local investment bankers in Baltimore, Md., continue to watch with interest the movement of the securities of the Washington, Baltimore & Annapolis Railway. Bonds of the company have been in demand since talk was heard of a new deal, in which the electric road would be a conspicuous figure. At the present price the yield is attractive and in any new merger or other proposition, it is explained, the bonds would probably be allowed to run to maturity, as refinancing could hardly be accomplished on a more favorable basis than the present one.

In this connection reports still persist that a deal involving a change of control of the electric line may soon develop. The rumors have, however, been denied by officials of the railway, as well as of the Western Maryland Railroad and J. E. Aldred, chairman of the boards of the Consolidated Gas, Electric Light & Power Company of Baltimore and the Pennsylvania Water & Power Company.

The common stock of the company touched 12¼ on the Baltimore exchange a few days ago. This compares with 5⅞ a few weeks ago. Bidding for the shares was spirited, and it was reported that some sizable blocks changed hands. As on recent days, buying was chiefly for out-of-town account, although local operators continued to add to their holdings.

Sale of Indiana Line Ordered

Sale of the property of the Beech Grove Traction Company, operating between Beech Grove and Indianapolis, Ind., 4 miles, at a price of not less than $30,000 has been ordered by the judge of the Circuit Court in Indianapolis. The sale will be held on June 22. The property is to be sold as a whole and not in parcels. The Fletcher Savings & Trust Company was named receiver for the road in November, 1917. According to Donald S. Morris, trust officer of the company, the receiver has been compelled to advance money for rebuilding the line and supplying a number of new cars. Receivership liabilities now total $30,000. Approximately $100,000 in bonds is outstanding.

Tax Appraisals Cut in Indiana

The State Tax Board of Indiana has just finished its work with interurban railways. An average of reductions shows 21.43 per cent less than for 1924. One of the members of the board said:

I doubt whether the interurban lines would sell today for the amount at which we have appraised them. In the last year several traction companies in the state have gone into the hands of receivers. A number of short-haul lines have been discontinued. Hardly any are paying dividends on stock. There is perhaps a single company in the state which is making any profit.

We could not set the valuation of these lines any lower and do justice to the taxpayers. It is to be hoped that regulation of bus lines under the new law and the continued efforts of interurban officials will result in interurban lines getting on their feet.

Net Income Falls Off.—The Eastern Massachusetts Street Railway, Boston, Mass., reports revenue for April of $752,929, against $805,699 during the corresponding month a year ago. The expenses were $586,452 in April of this year against $612,595 during April, 1924. The net income in April, 1925, was $58,559, against $79,123 a year ago.

Reorganization Seems Assured.—It is said that 85 per cent of the sinking fund bonds, 90 per cent of the 7 per cent notes and 66 per cent of the stock of the Denver Tramway, Denver, Col., have been deposited with the various protective committees and that it is almost sure an early announcement will be made that the tramway is out of the hands of a receiver and the new officers elected. Claude K. Boettcher, chairman of the joint reorganization committee, is in the East and upon his return a further statement may be forthcoming.

Deficit in Youngstown in April.—The Youngstown Municipal Railway, Youngstown, Ohio, in April showed a deficit of $7,859, the largest of any month thus far this year. The deficit represents the difference between expenditures of $175,867 and gross income of $168,008. Of the total income $126,962 was from street railways and $41,046 from buses. The report showed total mileage of 476,405, divided between cars, 331,276, and buses, 145,129. The total number of passengers carried on car and bus was 2,643,151. The present deficit in the stabilizing fund is $1,263,062.

Insulls Get Maine Property.—The Middle West Utilities, Chicago, Ill., an Insull corporation, has contracted for the purchase of the Central Maine Power Company, a consolidation of gas, electric and railway companies in Maine. The purchase will be through a $3,500,000 sale of common stock which will be delivered in Augusta, Me., about July 1, by Walter S. Wyman, an officer of the Maine corporation. The Insulls will pay about $140 a share. Included among the properties of the company are electric railways which operate 23.92 miles of track.

Reject Saltair Resort.—Members of the City Commission of Salt Lake City, Utah, recently forwarded to H. J. Grant, president of the Mormon Church, a letter declining the offer of the church to give Saltair Beach and the Garfield & Western Railroad to Salt Lake City. The commissioners expressed appreciation of the magnanimity of the church in offering the resort, but expressed regret that the city found itself facing financial difficulties which in the judgment of the commission would render it inadvisable for the city to undertake to take over and handle such a resort. The famous Saltair Resort is 15 miles west of Salt Lake City. Most of it was destroyed by fire on April 22. The property was offered to the city, with the idea of the city rebuilding the structure, which would have cost in the neighborhood of $250,000. An offer of $75,000 to the Mormon Church for the property was rejected.

131,200 More Shares of Public Service Common.—The Public Service Corporation of New Jersey, Newark, will shortly issue and sell to stockholders 131,200 additional no-par-value shares of common stock. Holders of the 8 per cent preferred, the 7 per cent preferred and the common will be entitled to subscribe to one share of the new stock for each 10 shares held at $62.50 a share. The privilege applies to stockholders of record of June 5, and subscriptions will be payable not later than Aug. 1.

Slight Increase in Income Available for Charges.—The Santa Barbara & Suburban Railway, Santa Barbara, Cal., reports to the Railroad Commission its 1924 operating revenue as $137,053 compared with $144,815 for 1923. The operating expenses, excluding taxes, for 1924 are reported as $103,755 and for 1923 as $113,382, leaving a net operating revenue of $33,298 for 1924 and $31,432 for 1923. During 1924 taxes charged to operation were $10,769 and for 1923 $10,485. Deducting the taxes leaves operating income of $22,528 for 1924 and $20,946 for 1923. Adding to the operating income the non-operating income of the company results in a gross corporate income available for interest, amortization of debt discount, other fixed charges, non-operating expenses, dividends and surplus of $22,528 for 1924 and $20,951 for 1923.

Book Reviews

1924 Proceedings of National Association of Railroad and Utilities Commissioners

Two volumes in one, containing the proceedings of the thirty-sixth annual convention held in Phœnix, Ariz., Nov. 11 to 14, 1924, and the proceedings of the National Conference on Grade Crossings held in Chicago, April 30 and May 1, 1924. Published by the National Association of Railroad and Utilities Commissioners, J. B. Walker, secretary, 270 Madison Avenue, New York. $5.

By invitation, several representatives of the great public utilities of the country addressed the Phœnix convention. Among them were: H. C. Abell, president, and Alexander Forward, secretary-manager of the American Gas Association; William Sproule, president of the Southern Pacific Company; J. N. Shannahan, president, and J. P. Barnes, vice-president of the American Electric Railway Association; M. H. Aylesworth, executive manager of the National Electric Light Association; Carl D. Jackson, special counsel of the National Electric Light and American Gas Associations; Eugene S. Wilson, vice-president of the American Telephone & Telegraph Company; Fred B. MacKinnon, president of the United States Independent Telephone Association. The addresses of these leaders in their respective industries will be found in full in this volume.

The Phœnix convention adopted a series of resolutions bearing on the amendment of the transportation act of 1920, so as to define more clearly the powers of the states. The subject was also covered in the address of H. G. Taylor of Nebraska, the retiring president of the association. Both will be found in this volume.

In the 1924 volume also will be found an address on "The Labor Investment in the Railroads," by Donald R. Richberg of Chicago, counsel for the railroad brotherhoods, and an address by Dr. E. A. White, director of the committee on the relation of electricity to agriculture. Major Alexander Forward's address on the prospects of fuel scarcity contains some startling facts and predictions.

Other subjects covered are: Car Shortage Problem, Federal and State Regulation, Public Utilities under Regulation, Standardization of Accounts, Safety of Operation, Railroad Valuation, Express Companies, The Labor Investment in Railroads, Public Ownership and Operation, The Grade-Crossing Problem, Motor Vehicle Transportation, Amendment of Transportation Act, Rates and Service, Telephone Depreciation, Uniform Regulatory Laws, Fuel Resources Imperiled.

Electric Railway Practices in 1924

Summary of most significant features of presentations made by electric railways Aug. 15, 1924, to the Charles A. Coffin Foundation. Edited by Henry H. Norris for the Foundation. Published by the American Electric Railway Association, New York, 1925. 179 pages. Illustrated.

Nine electric railway companies made presentations of their practices for the Charles A. Coffin prize during 1924. These presentations have been digested in book form, so that those interested in the industry may easily obtain a summary of methods. The information has been grouped in nine chapters, each devoted to some subject related to electric railway practice, and the method followed by each company as described in its presentation is given in that chapter. The chapter headings follow: Tendencies in Rolling Stock Practice, Improving Service Quality and Quantity, Advertising the Service, Fostering Good Public Relations, Relations Between Management and Employees, Progress in Accident Mitigation, Cutting Construction and Maintenance Costs, Economical Administration and Financial Structure of Electric Railways.

The book is uniform in style with "Electric Railway Practices in 1923."

and is well illustrated. It should offer many helpful suggestions on modern methods which have proved successful on numerous electric railways.

Municipal Ownership

By Carl D. Thompson. Published by Thomas Y. Crowell, New York. 445 pages. $3.

Carl D. Thompson, the author, is secretary of the municipal ownership league of America. He has set out to survey publicly owned utilities and to forecast the future. His publisher says in the blurb on the book that the chief purpose is to present an impartial survey of what has actually been done in the field of public ownership of public utilities.

Of this book of 445 pages only 28 are devoted to municipal street railways. This seems in some respects disproportionate. The treatment is patchy rather than profound. The author says "we have in America not only numerous smaller cities owning and successfully operating municipal street railway car lines but three of our large cities." It is true that some of these cities have done well in running the roads, but whether they have been a success depends on what one means by success. Still, this is not an occasion to cavil. The book deserves the careful attention of all students of public utility problems.

To get back to the beginning, Mr. Thompson first discusses the "limitations of municipal ownership"—showing how it logically embraces basic industries only and not all utilities. Then comes a chapter on the "Extent, Growth and Success of Public Ownership." Under "Familiar Forms" are discussed schools, libraries, postal systems, etc. The question of the ownership of railroads, steamship lines and of means of communication next comes in for discussion. This is followed by "Mines and Mining," "Electric Light and Power," "Water Works," "Street Car Lines," "Gas Plants," and similar utilities. There are chapters on the Ontario Hydro-Electric System and Public Super-power, the latest development in the field of electric utilities; also sections on the Canadian Government Railway and the Alaskan Government Railroad. As is indicated previously, a final chapter is devoted to "Objections to Public Ownership," in which, by the question and answer method, the whole subject is reviewed and an effort is made to meet some of the objections often urged against municipal ownership.

Facts and Figures of the Automobile Industry

Published by the National Automobile Chamber of Commerce. 1925 edition. 96 pages.

This is the sixth annual edition of "Facts and Figures of the Automobile Industry." The book aims to compile in ready reference form the essential data on the status and development of motor transportation, including such topics as production, registration, railroad traffic, uses of motor cars, highways, legislative principles, trucks, bus and taxi statistics and the relationship of rail, water, electric and motor transportation.

Personal Items

New Detroit Manager

Colonel Wallace, Successor to Ross Schram, Has Entered Upon His New Duties

Col. H. U. Wallace is the new general manager of the Detroit Department of Street Railways, Detroit, Mich., succeeding Ross Schram. Back of him is 30 years of engineering and railroading experience. He has expressed his determination to give the car riders in Detroit the best possible service as cheaply as possible, keeping in mind that it will be his bounden duty to protect and conserve the great investment which the people of Detroit have in the municipal street railway system.

Since January, 1924, he has been assistant general manager of the Knoxville Power & Light Company, with direction of all of that company's activities. He supervised the reorganization of the railway department of the company and is said to have put that department on a self-sustaining basis.

H. U. Wallace

During the war he was commissioned as Major of engineers and assigned to the construction division as supervising constructing officer of a large number of the most important ordnance plants. After the armistice, his rank having been raised to Lieutenant-Colonel, he had charge of dismantling all ordnance construction work and was discharged from the army on March 1, 1919. After being engaged with his father on water-power development in Georgia he became assistant general manager of the Arkansas Central Power Company in charge of operation.

Colonel Wallace was born in Rock Island, Ill., in 1872. He is the son of John Findley Wallace, chief engineer of the Panama Canal under President Roosevelt. He was graduated from Purdue University and in 1894 was engaged as assistant engineer for the Illinois Central Railway. During his years of service with that railroad, of which his father was general manager, he was resident engineer in charge of the Illinois Central's lake front improvements, roadmaster of the Chicago division, roadmaster and assistant superintendent of the Louisville division and superintendent of the Louisville and Freeport divisions.

From 1903 until 1906 he was chief engineer of the Illinois Central in charge of all maintenance and construction work. He resigned in 1906 to become third vice-president of J. G. White & Company, New York, in charge of construction work. He was later general manager of the Chicago, Lake Shore & South Bend Railway, which he operated for eighteen months. He resigned this position to go into business as consulting engineer in Chicago. His return to active railroading was as vice-president in charge of operation and reconstruction of the Fort Dodge, Des Moines & Southern Railway.

In 1912 Colonel Wallace inspected the holdings of the Northern Colorado Power Company. As a result of his work on this property and the recommendations he made a new company, the Western Light & Power Company, was organized.

F. W. Webster Made Vice-President

Frank W. Webster, general manager of the Stockton Electric Railroad, Stockton, Cal., has been promoted with the title of vice-president and general manager of the Fresno Traction Company, the Fresno City Railway, the Stockton Electric Railroad, and the Visalia Electric Railroad. The properties are all controlled by the Southern Pacific Company. For more than ten years Mr. Webster has been the general manager of all the electric lines in the San Joaquin Valley affiliated with the Southern Pacific.

D. H. Braymer in Consulting and Sales Field

Daniel H. Braymer has resigned as editorial director of *Industrial Engineer*, a McGraw-Hill publication, in order to devote the major part of his time to the activities of the recently organized D. H. Braymer Equipment Company. He will retain his connection with the McGraw-Hill Company as consulting editor of *Industrial Engineer*.

Mr. Braymer's newly organized company will have its headquarters in Omaha, Neb. It will specialize in consulting and sales work associated with power applications in industrial plants, large buildings and power plants and will act as the authorized representative of several manufacturers of related power equipment in Nebraska and Iowa.

The career of Mr. Braymer fits him admirably for his new occupation. He was born in New York State and completed his engineering education at Cornell University. In 1915 he became associated with the McGraw-Hill Company as engineering editor of the

Electrical World and, with the exception of two years service as editor of the *Electrical Record*, he retained his association with the *Electrical World*, in later years as managing editor and co-editor. When the *Electrical Review* was purchased by the McGraw-Hill Company Mr. Braymer was placed in charge of both the publishing and editorial policies of its successor, the *Industrial Engineer*, with headquarters in Chicago.

Careers of Former Detroit Officials Reviewed

Ross Schram, succeeded as manager of the Department of Street Railways at Detroit, Mich., by Col. H. U. Wallace, was a former newspaper reporter selected as secretary by Mayor James Couzens in 1918. Prior to his connection with the street railway situation in Detroit Mr. Schram was engaged in publicity and advertising work for automobile companies. He also operated an automobile agency in Ottawa, Canada, but returned to Detroit in 1917 and again joined the Detroit *News* staff.

He obtained an intimate knowledge of the former Mayor's plans and policies during the municipal-ownership campaign. In addition to being secretary to the Mayor he was secretary to the first Street Railway Commission. After holding this position for several months he was made assistant general manager under Joseph S. Goodwin. Following Mr. Goodwin's death about two years ago, W. B. Mayo, chief engineer of the Ford Motor Company, was made general manager.

When Mr. Mayo resigned last June Mr. Schram was appointed general manager on Mr. Mayo's recommendation. At that time Mr. Mayo said that Mr. Schram's record entitled him to full credit and full responsibility. Not only that but the Street Railway Commission itself attributed much of the success that had attended the operation of the railway to the vigor and enthusiasm of Mr. Schram. He certainly possesses these attributes. They are essential to success in journalism, and Mr. Schram was a success at that, as was proved on many occasions in his handling of the work of the railway. At the time of his appointment to the post of manager last July Mr. Schram's career was reviewed at length in the ELECTRIC RAILWAY JOURNAL, special attention being given to his record with the railway. This sketch was accompanied by a portrait.

I. N. Merritt, former auditor of the Department of Street Railways at Detroit, began his career, strange as it may seem, in the shops of the Grand Trunk Railway in his home town, Battle Creek. It is said that after he had run a crane off the track he decided he was not fitted for a career in mechanics and so set off for college. After leaving college he went with the Burroughs Adding Machine Company in Detroit as cost accountant. In 1909 he returned to Battle Creek, where he assumed a position with the Grand Trunk System, but later in the same year he joined with several others and served as brakeman on the road for nine months.

In 1911 he went back to the Burroughs company, where he remained until 1914, when he accepted a position as cost man with the construction division of the Detroit United Railway, which was then operating the city railway lines now included in the municipal system. Mr. Merritt also was responsible for all building appraisal in connection with the Bemis appraisal work at Detroit. Feeling that he must know more about his chosen profession, accounting, he took up the study of commerce and finance at the University of Detroit, working during the day and attending class in the evening. Finishing his course in three years, he joined the firm of Thompson & Black, accountants, where he remained until 1920, when he joined the forces of the municipal railway. Mr. Merritt has been secretary of the Street Railway Commission as well as auditor of the D. S. R. He is only 34 years of age.

R. B. Campbell President Mid-West Association

At its recent meeting in Kansas City the Mid-West Electric Railway Association elected R. B. Campbell, secretary-treasurer and general manager of the Arkansas Valley Interurban Railway, president for the ensuing year.

R. B. Campbell

Mr. Campbell has been a member of the executive committee and vice-president of the association. His election as president marks another step in the progress of a career in the electric railway industry which began when the Arkansas Valley Construction Company was organized in 1909 to build the Arkansas Valley Interurban Railway. Mr. Campbell was first secretary and later became general manager of the railway.

Mr. Campbell is a native of Illinois, but has lived in Kansas most of his life. He was educated in Wichita, and his early experience was gained in the cattle business in which he was engaged for about fifteen years. Later he served in the Kansas Legislature as a representative from Mead County from 1902 to 1905. He also served two terms as City Commissioner of Wichita, from 1911 to 1915.

When the first unit of the Arkansas Valley Interurban Railway was completed in 1911, Mr. Campbell, as its secretary, got his first railway operating experience. In 1916 the construction was completed, and upon dissolution of the construction company, he remained in the railway field as secretary, treasurer and general manager of the interurban.

When the bus began to attract interest, Mr. Campbell saw the importance of linking it up in a constructive way with existing railway lines, and in December, 1924, organized the Arkansas Valley Transportation Company, of which he is president, to operate buses in the territory contributory to the Arkansas Valley Interurban Railway.

He has been active during the past year as a member of the legislative committee of the Mid-West Electric Railway Association, in which capacity he was instrumental in getting a bus regulatory law passed by the State Legislature during the last session.

George D. Fearman, formerly assistant secretary of the Dominion Power & Transmission Company, Hamilton, Ont., has been appointed secretary. In this new capacity he succeeds the late William Clarke Hawkins, who was also managing director.

J. R. Biedinger has tendered his resignation as structural engineer of the Rapid Transit Commission of Cincinnati, Ohio. Mr. Biedinger is considered one of the most valuable of the corps of engineers who have been employed by the transit commission. His resignation was the result of a desire to go nto private practice.

William Chamberlain, general manager of Oldham Corporation Tramways, has been appointed general manager of Leeds City Tramways, Leeds, England, succeeding the late J. B. Hamilton.

E. B. Kessler has succeeded Ralph Peters as superintendent of the Long Island Railroad. In the issue of the ELECTRIC RAILWAY JOURNAL for May 16 it was inadvertently stated that Mr. Kessler would succeed Mr. Peters as president.

Albert Collier has resigned as secretary of the Georgia Public Service Commission. He had served that body for about seven years. No successor has yet been named to fill the vacancy.

John H. Porter is to be appointed by Governor Baker of Missouri a member of the Missouri Public Service Commission to succeed E. J. Bean of De Soto, Mo. The Governor recently made an announcement to this effect. Mr. Porter is a civil engineer and was graduated from the University of Georgia. During the World War he served in the Engineering Corps.

Richard W. Martin, Pittsburgh City Solicitor, was recently appointed by Governor Pinchot the seventh member of the Pennsylvania Public Service Commission. Mr. Martin was named to the vacancy on the commission caused by the failure to confirm the nomination of Commissioner Fred J. Miller, Center Bridge, Bucks County. If confirmed by the next Senate Mr. Martin would hold office until July 1, 1933. Mr. Martin was graduated from the University of Pittsburgh in the law department; he was admitted to the bar and became affiliated with John S. Weller, then a State Senator. Later

He became active in Republican party politics in Pittsburgh.

Major G. H. Simpson, until recently director of public relations of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., has resigned to accept a position with a Chicago advertising concern. Major Simpson became director of public relations for the railway in December, 1923. He founded the *Rylite Employees' News,* which has been issued for fourteen consecutive months.

Obituary

D. W. Ross

David William Ross, president of the United Collieries Company, formerly vice-president and purchasing agent of the Interborough Rapid Transit Company, New York, died on June 10. Mr. Ross was born at Mineral Point, Wis., 55 years ago. He entered the service of the Illinois Central Railway at the age of nineteen, remaining there for seventeen years. The last year he was general superintendent of transportation. He had long been associated with Theodore P. Shonts in railroad work. They worked together on the Panama Canal. When Mr. Shonts became president of the Interborough he invited Mr. Ross to join him. After leaving the Panama Canal Commission Mr. Ross served for a year as managing director of the Magnus Metal Company, New York, and then became vice-president of the Interborough Rapid Transit Company, the Interborough-Metropolitan Company, the Rapid Transit Subway Construction Company and a director in the New York & Queens County Railway. He later became vice-president of the New York Railways Company. He continued with the Interborough interests until the early part of 1920.

William E. Dowdell, for the past ten years superintendent of the Portsmouth Electric Railway, Portsmouth, N. H., a subsidiary of the Boston & Maine Railroad, died on June 5 at the Relief Hospital, Boston. Prior to his being appointed general superintendent he was assistant general superintendent of the line which operates from Portsmouth, Rye and North Hampton. Mr. Dowdell spent his early years on the sea, in which service he rose to a captaincy. Later he was employed by the Bay State Street Railway, going to Portsmouth in 1915 to succeed F. P. Fosgate.

William Clark Hawkins, secretary, managing director and chief engineer of the Dominion Power & Transmission Company, Ltd., Hamilton, Ont., died suddenly on May 11. In 1912 when Mr. Hawkins was general manager of the Dominion Power & Transmission Company he was elected managing director. In 1917 he was elected president of the Southern Canada Power Company. The Dominion Power & Transmission Company controls among other properties the Hamilton Street Railway, and the Hamilton Radial Electric Railway. In the old cable car days Mr. Hawkins was assistant engineer on the Third Avenue Road, New York.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Rules to Govern Purchases

At the convention of the National Association of Purchasing Agents, held in Milwaukee May 25-28, some recommendations were drafted as to the principles and plans of purchasing for state, county and municipal governments. The following procedures, taken from these recommendations, apply to purchases by corporations where there is a regularly organized purchasing department and will be of interest to utility purchasing agents:

1. Purchase requisitions covering materials or supplies not obtainable from any point from regular stock supply, properly approved by department head and covering complete description of material and specifications, are to be forwarded to the purchasing agent. These requisitions should describe but one class of material in accordance with storekeeper's standard classification, and should state whether funds are available in the budget to cover value of recommended purchase. Requisitions for replenishing stock items or additions to stock supply shall be sent by the storekeeper to the purchasing agent.

2. The purchasing agent is to obtain prices and close to the best advantage for material covered by requisition.

3. Orders should be written in four copies, the vendor receiving the original, the purchasing agent retaining the duplicate, the triplicate to be sent to the receiving or using department, the quadruplicate to the testing department.

4. Invoices are to be checked against order in the purchasing agent's office as to quantities, prices, f.o.b. freight allowance, terms, etc., and a record taken of the invoice.

5. The general storekeeper shall render to the purchasing agent each day a tally sheet itemizing quantities and description of items received, giving vendor's name, purchasing agent's order number and disposition.

6. Invoices, properly approved by the purchasing agent, should then be passed to the proper fiscal officer for payment, record having first been made of the date that each invoice was passed before expiration of discount period.

7. A suitable record indexed according to materials should be kept showing dates and quantities purchased as well as the price and discount.

8. The purchasing agent shall govern the sale of any and all scrap and surplus materials. A list of scrap and surplus materials should be submitted by the storekeeper.

Ohio Brass to Split Shares

Stockholders of the Ohio Brass Company, Mansfield, Ohio, have been asked to approve a split-up of present stock, two for one, exchange to be made with new no par common. The company has paid dividends on the common stock for 21 of the last 23 years without interruption. Net earnings for the three years ended Dec. 31, 1924, it was announced, averaged $6.49 a share on the company's no par value common stock to be outstanding after the proposed stock dividend.

The company has only $2,100,000 of preferred stock outstanding. It has no funded debt.

Bureau of Mines Transferred to Department of Commerce

President Coolidge by executive order on June 4 transferred the Bureau of Mines from the Department of the Interior to the Department of Commerce.

Two offices of the Bureau of Mines will remain under the Interior Department, those having to do with coal, oil and other mineral land leasing.

Secretary Hoover said that the Bureau of Mines was created as a service bureau for the mining industry and that it was his purpose to develop its activities. He said that he would soon appoint a committee representative of organizations of mining engineers and the mining industry to study ways and means to increase the efficiency of the Bureau of Mines and divisions of the Department of Commerce which do work of similar character.

In furtherance of the same purpose to combine all government business agencies under one head, the president some months ago transferred the Patent Office to Secretary Hoover's department, and other bureaus will be similarly treated when the required legislation is obtained under the reorganization act.

Complete Trade Statistics Make for Competition

As more opportunity is afforded for study of the Supreme Court's decision in the matter of trade statistics a very general conclusion is being reached that it is one of the finest definitions of law

Metal, Coal and Material Prices

Metals—New York	June 9, 1925
Copper, electrolytic, cents per lb.	13.50
Copper wire base, cents per lb.	15 875
Lead, cents per lb.	8 40
Zinc, cents per lb.	7.34
Tin, Straits, cents per lb.	55 50
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.275
Somerset mine run, Boston, net tons	1.975
Pittsburgh mine run, Pittsburgh, net tons	1.95
Franklin, Ill., screenings, Chicago, net tons	2 125
Central, Ill., screenings, Chicago, net tons	1.775
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6 25
Weatherproof wire base, N.Y., cents per lb.	17.85
Cement, Chicago net prices, without bags	2 20
Linseed oil (5-lb. lots), N. Y., per gal.	$1 09
White lead in oil (100-lb. keg), N. Y., cents per lb., carloadlots	0 1575
Turpentine (bbl. lots), N. Y., per gal.	$1 01

in relation to economics that ever has been handed down by the judiciary. The court is as emphatic in its pronouncements against conspiracies to fix prices or to limit distribution as it is in pointing out that a statistic service is not such a conspiracy. The recent ruling claiming that trade statistics are not illegal was reviewed in the ELECTRIC RAILWAY JOURNAL, issue of June 6, page 913.

One of the dangers of a decisive victory of this character, it is pointed out, is the encouragement it will give trade associations that are disposed to edge over the line. It is clear that the court regards secret statistics as being over the line. If the 95 per cent who never have made improper use of statistics are not to suffer again from the wrongdoing of a few, they should do all within their power to discourage any misuse of the function which has been stripped of uncertainty. The discussion of this subject for the past several years has had the effect of focusing public attention on these activities. Publication of all statistics is believed to constitute the greatest safeguard that can be set up.

The position of the court is regarded as a striking substantiation of the position taken three years ago. At that time Secretary Hoover, through a letter written to the Attorney-General, gave the country a comprehensive set of arguments showing that it was neither sound nor warranted to deny industry a statistical service. The Department of Commerce, in addition, took the position that complete statistics of prices of past transactions make for competition.

Exhibit Applicants for A.E.R.A. Convention Increase

Space applications for the October convention of the American Electric Railway Association have been out ten days. Up to the close of business June 10, 77 companies had applied for 42,743 sq.ft. of space. For the same period last year 45 companies had applied for 26,254 sq.ft. A little better than two weeks still remains in which to file applications so as to have them considered by the exhibit committee when it meets on July 1 to make the official space assignment. Application for space can be made to Fred Dell, director of exhibits, at association headquarters, 292 Madison Avenue, New York City.

Rolling Stock

Kansas City Railways, Kansas City, Mo., through Receivers Wilson and Fleming, awarded the contract for 25 single-deck, six-cylinder, 29-passenger buses to the Yellow Coach Company, Chicago, on June 10. Chassis for eighteen double-deck buses and five parlor buses were ordered from the Six Wheel Safeway Manufacturing Company, Philadelphia. All double-deck buses are to be delivered in St. Louis within 42 days and parlor cars within 49 days. All bodies will be built by one of two car companies in St. Louis, according to special designs of the Kansas City Railways. Single-deckers will have 230 in. wheelbase, air-operated front and rear doors and air brakes.

Track and Line

Northern Ohio Traction & Light Company, Akron, Ohio, will spend more than $1,000,000 in railway betterments. About 40,000 new ties are being placed on various sections. Extensive repair work is being done in Akron. The cost of building new track on four streets will be $300,000. Other repair work includes the double tracking of High Street in Barberton at a cost of $125,000. Improvements at Meyers Lake Park total $35,000. New tracks in Canton will cost about $150,000, with the double track between Canton and Massillon, practically completed last year, costing $28,000. In the city of New Philadelphia worn-out tracks are being removed and up-to-date tracks placed on steel ties and concrete construction are being substituted. The total cost of this improvement is $50,000. The sum of $7,500 is being spent in the raising of 2 miles of track between Midvale and Uhrichsville. Contemplated new tracks between Bedford and the city limits of Cleveland will cost $300,000.

Iowa Railway & Light Company, Cedar Rapids, Iowa, will pave between the car tracks at Third and Main Streets in Marshalltown, using Lumnite cement. This experiment in concrete paving will be watched with interest by the city administration.

Seattle, Wash. — The utilities committee of the City Council has approved an ordinance authorizing the extension of the Cowen Park line of the Seattle Municipal system from Ravenna Boulevard and Fifteenth Avenue northeast to the Bothell Road. The project will be financed by the sale of $72,000 interest-bearing railway warrants.

Municipal Railway of San Francisco, San Francisco, Cal., is extending its line into the Spring Valley Water Company property and the Ocean View tract by way of Junipero Serra Boulevard. The cost of this work will probably reach $265,000. The Spring Valley right-of-way is about 7,000 ft. long. It was donated to the city for the car line.

Nashville Railway & Light Company, Nashville, Tenn., will spend about $53,000 to reconstruct its tracks and pave between and for 2 ft. on each side of its double tracks on Fatherland Street from Second Street to Eleventh Street.

Power Houses, Shops and Buildings

San Francisco Municipal Railway, San Francisco, Cal., will have a new carhouse and shop at Bryant and Mariposa Streets, following the voting by the Board of Supervisors of $70,000 for the purchase of this block of land. The question has been under debate for one and a half years.

Key System Transit Company, Oakland, Cal., will spend about $300,000 in rehabilitating its power system in the East Bay cities of California. Work already started has for its object practically a complete revision and modernization of the method of carrying power from substations to the cars. The new power distributing system will not only take care of the normal increase in business, but will also make it possible to have ample power at full voltage applied to car motors, thus providing for quicker acceleration, faster schedule speed and consequent better service. The new Hobart unit will cost approximately $24,000.

Public Service Railway, Newark, N. J., recently received permission to construct a commercial garage at 222-38 Bloomfield Avenue, to house about 140 buses, and to cost approximately $150,000. This location was for many years the site of a carhouse built in horse car days. It is now occupied by an open store yard for cars and a small repair shop. The garage will be of modern construction and will be the headquarters of the Bloomfield, North Newark, Summer Avenue and Market line buses. Objections to the garage were overruled by the zoning commission, which held that the change would be an improvement and would tend to increase rather than depreciate property values in that section.

Trade Notes

Morton Manufacturing Company, Chicago, Ill., announces the appointment of the Peden Iron & Steel Company with offices in Houston and San Antonio, Tex., as its exclusive and direct representative covering the sale of its "Acme" line of railway appliances in the extreme southwestern section of the United States and Mexico.

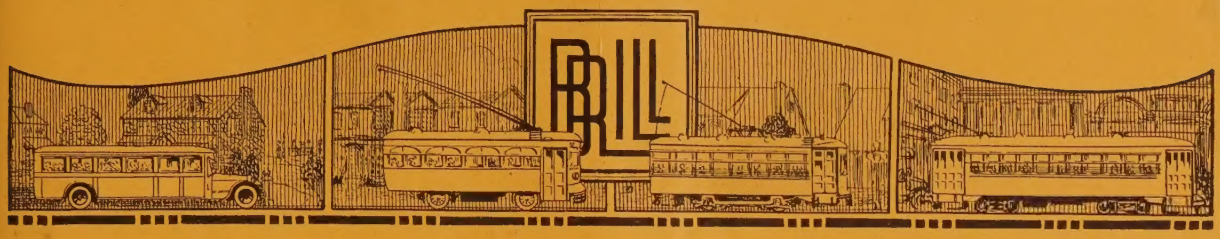
American Appraisal Company, Milwaukee, Wis., has recently opened offices in Dallas, Tex., 612 Mercantile Bank Building, and in Kansas City, Mo., Pioneer Trust Building. L. B. Jones is in charge of the Dallas office and John F. Wood of the Kansas City office.

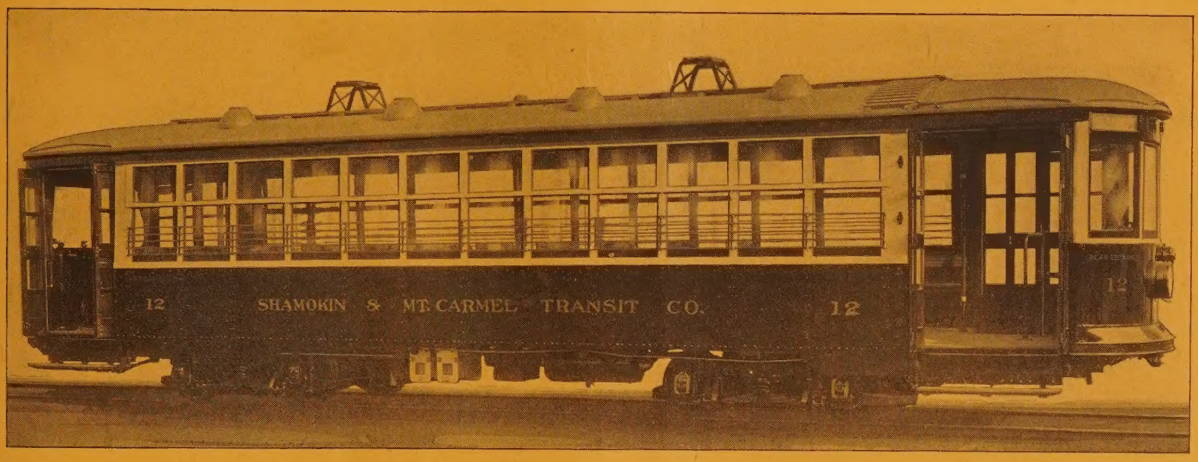
George A. Muir, who has been connected with the Denver office of the Allis-Chalmers Manufacturing Company for the last five years, and for ten years previous to that with the machinery department of the Mine & Smelter Supply Company, Denver, has been elected to the office of president and manager of the Advance Machinery & Supply Company, Railroad Building, Denver, Col., which manufactures the Advance patented mechanical stoker and the Advance soot blower.

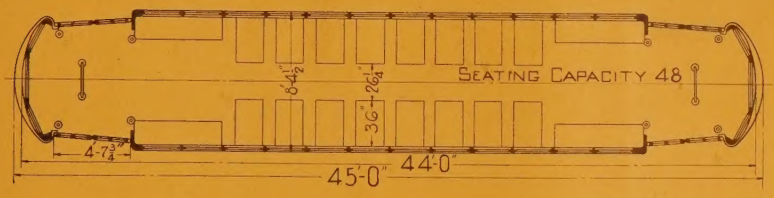
New Advertising Literature

Crouse-Hinds Company, Syracuse, N. Y., has issued Bulletin No. 214, on electric flashing beacons and automatic isolated traffic signals.

English Electric Company, Ltd., London, has issued an illustrated booklet descriptive of various types of electric locomotives manufactured by it. For the most part these machines are designed for operation by direct current at 1,500 volts. The control is of the all-electric type. The company's well-known camshaft controller is a feature of the locomotives.







Brill 77-E-1 Low-level Trucks
Twin Swing Links

Shamokin & Mt. Carmel Transit Co.'s

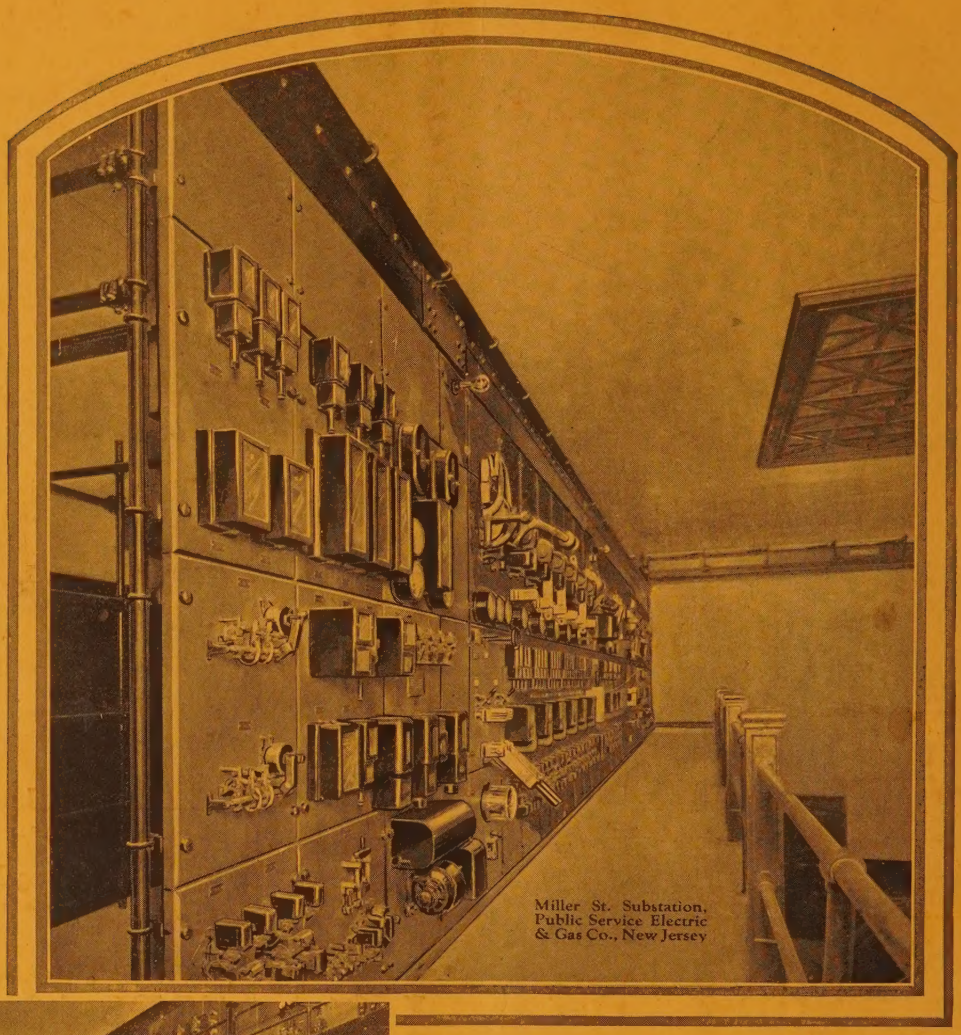
Light-Weight Double-end Cars

The latest equipment to be placed in service by this company on its nine-mile route between Shamokin and Mt. Carmel comprised seven modern type cars built in our Philadelphia Plant.

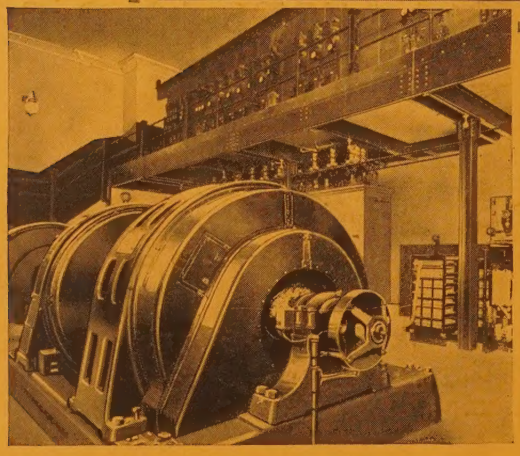
Under these cars the Brill No. 77-E-1 low-level type trucks are equipped with Brill Twin Swing Links which retain the smooth and steady riding action of this popular Brill truck on uneven track and under higher rates of speed.

Complete weight on trucks, and including quadruple 35 Hp. motor equipment, is 35,786 lbs.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G. C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.



Miller St. Substation,
Public Service Electric
& Gas Co., New Jersey



Another
Noiseless G-E Automatic

This one is more than a railway substation, having four types of G-E Automatic Equipment:

Motor-generator set control
Transformer bank control
D-c. reclosing feeders
A-c. reclosing feeders

Automatic control permits totally enclosed and sound-proof building construction since no operator is required. Are you taking full advantage of it for substations located in restricted districts?

4-1

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN ALL LARGE CITIES